# The Illinois Dental Journal

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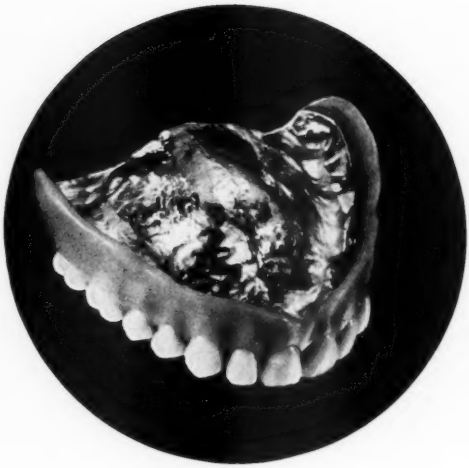

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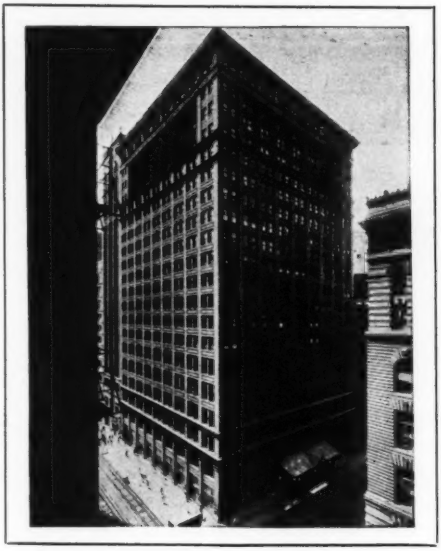

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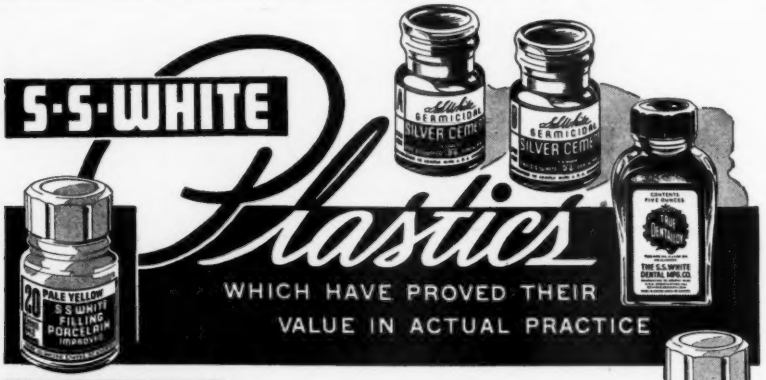


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# The Illinois Dental Journal

VOLUME 8 January, 1939 NUMBER 1

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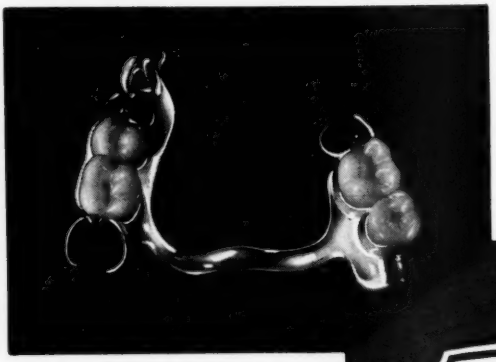

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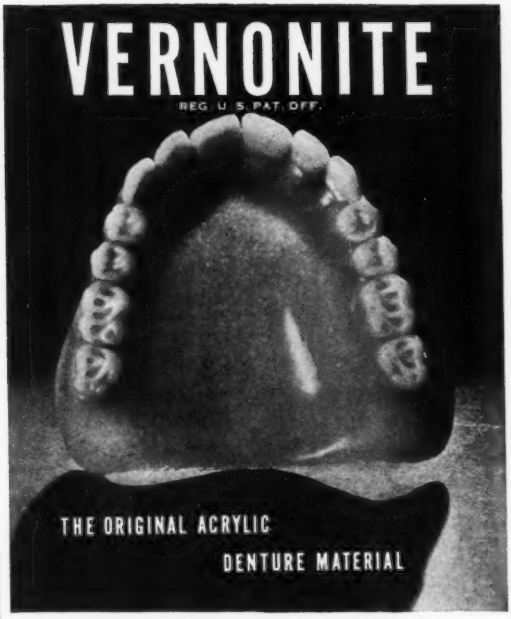


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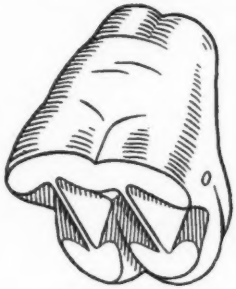

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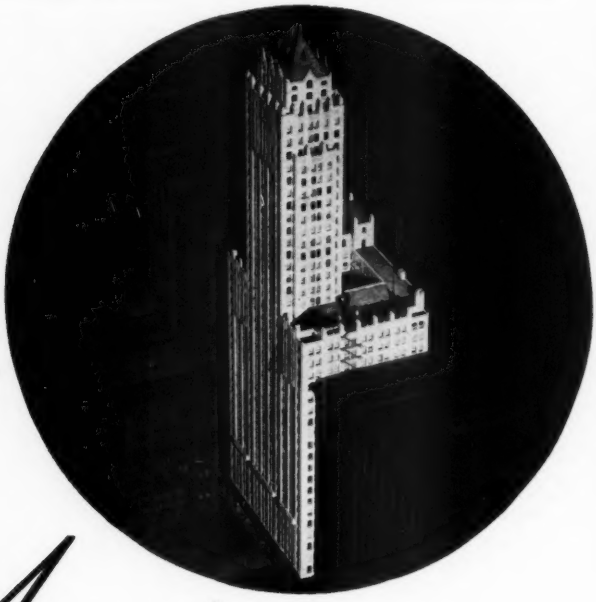

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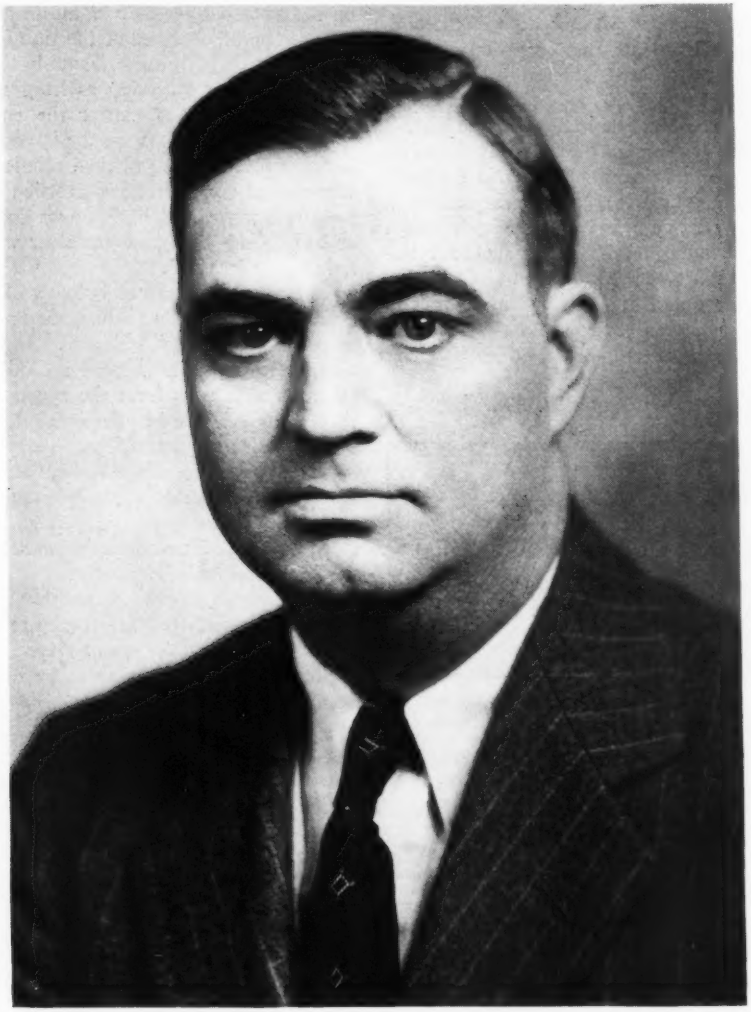

LAWRENCE W. NEBER

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# THE TEMPORO-MANDIBULAR JOINT *

*By* ALLAN G. BRODIE, D.D.S., M.S.

## COMPARATIVE ANATOMY

EVEN a cursory examination of the temporo-mandibular joint of various animals reveals a striking adaptation of its form to the form of the associated teeth which in turn reflect the nature of the diet.

*The Carnivora.* Fig. 1. In flesh eaters we find a joint that lies in the same horizontal plane as that of the occlusion, while the coronoid process extends to a much higher level. The condyle is cylindrical in form and disposed horizontally, the left and right lying in practically the same transverse axis. The fossa has the form of an open-sided tube which closely embraces the condyles. In some, this is so accurate that disarticulation,

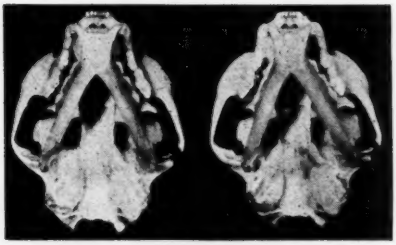

Fig. 1

Basal view of carnivorous skull showing disposition of condyles. Left, relation of teeth in centric; right, relation of teeth at beginning of left masticating stroke.

even in dried specimens, is impossible without fracture. Movement is free only in a vertical rotary manner around the axis of the condyle as a center. A small amount of straight lateral shifting is possible and this is limited by the ligaments.

The disposition of the musculature in these animals is such as to give a very good idea of the probable role of each of the so-called muscles of mastication. The temporal, attached at the tip of the coronoid process, runs horizontally backward, its fibres diverging as it goes, to take its origin over almost the entire back of the head. Its speed of reaction is very great and its principal role is the snapping of the jaws. Its direction and level also make it the chief antagonizer of dislocating forces, so prevalent when living prey is seized.

The masseter, large and slower of reaction, is disposed in such a manner as to permit of powerful closure. But in addition to this, its marked medial inclination as it runs from the zygoma to the ramus gives it in effectiveness as a lateral shifting agent of the mandible.

The pterygoids are disposed almost horizontally and run laterally from the pterygoid lamina to the internal surface of the ramus. Their function, together with the secondary function of the masseter noted above, is to shift the mandible laterally in order to bring the buccal surfaces of the mandibular teeth (principally the great canines) into contact with the lingual surfaces of their antagonists. A strong bucco-lingual pressure during closure is thus maintained.

*The Herbivora.* Fig. 2. In those animals whose diet is limited to grasses and plant life, principally the ruminants, all of the aforementioned parts are present but in a different arrangement. The condyle is now approaching the level of the coronoid process and both lie at a much higher level than that of the teeth. The condyle itself has lost most of the cylindrical character and the shape of the fossa permits of great range of movement. In some forms there is a

*Presented before the Odontographic Society of Chicago, December 13, 1937, as the third paper in the symposium on "Occlusion."

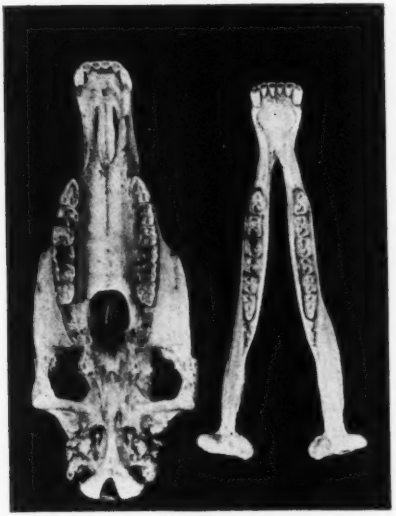

Fig. 2
Occlusal view of herbivorous dentition (horse). Note difference in width; size and disposition of condyles.

prominence in front of the fossa similar to the articular tubercle in Man. The functional direction is preponderantly horizontal.

In these beasts the temporal has shrunk to comparative insignificance, occupying a relatively small area on the skull. The masseter remains powerful and the pterygoids, owing to differences in proportion between face height and width, are assuming a more antero-posterior direction.

*The Rodents.* Fig. 3. In the gnawing animals we have a denture with a dual purpose. Its incisors are specialized for getting at its food and these teeth function well ahead of the masticatory organ which is composed of premolar and molar elements. The form of these latter groups is determined by the diet itself. Thus the *masticating* apparatus may be of an omnivorous, herbivorous or insectivorous type with joint movements to accommodate such teeth, while the incisors are alike in pattern in all classes.

The two parts of the denture cannot work simultaneously since when the posterior teeth are in masticating position the lower incisors lie considerably dorsal to the uppers. Conversely, when the incisors are functioning the posterior teeth are well out of occlusion. This necessitates a joint possessing a wide antero-posterior range with all functioning movements possible at each end of the range. The condyles may be ball-like or flattened laterally and work in what amounts to a groove that is formed medially by the side of the skull and superiorly by the flattened roots of the zygomatic process. This process forms a shelf which projects from either side of the head. In these animals we again see a cooperative arrangement of the pterygoids and masseter muscles. The masseter consists of four heads, two of which run almost horizontally backward from beneath the orbit of the eye to the outside of the posterior border of the mandible. The pterygoids follow a similar course inside of the ramus. This arrangement provides a mechanism not only for shifting the mandible from a prehensile to a masticating position, but also for the maintenance of sharp incisal edges through the alternate passing of the mandibular tooth in back and in front of its maxillary antagonist. In this it is assisted by the temporal which

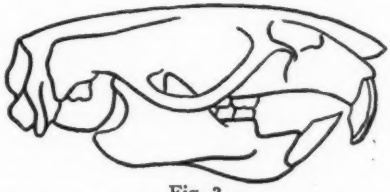

Fig. 3
Tracing of rodent skull. Note relation of incisors when posterior teeth are in occlusion.

takes care of retraction. This type of animal shows the greatest range of movement and this movement seems to be kept within proper limits by the musculature itself since no system of ligaments would serve this purpose without inhibiting some of its movement.

### The Human Joint

The condyle in man is reniform, with its axis running medially and slightly backward so that that of the right and left sides would meet in the neighborhood of the anterior margin of foramen magnum. It lies at approximately the same level as the well-developed coronoid process and both are at a considerably higher level than that of the occlusion. It is received into the articular part of the glenoid fossa which recess is contributed by the squamus and petrous parts of the temporal bone. Anteriorly it is bounded by the articular tubercle which appears to be an accentuation of the medial root of the zygomatic process. The curvature of the floor of the fossa and that of the surface of the condyle are not concentric, the condyle being much smaller. Separating the two is the meniscus, or inter-articular disc, a pad of fibrous connective tissue which is thin in the center and grows thicker toward the periphery. This pad covers the entire upper surface of the condyle and is attached to it in back in company with the capsule.

The capsule encloses the entire joint. It is attached below around the periphery of the articular surface of the condyle and above to the limits of the articular fossa. It is to this structure that the meniscus is attached anteriorly, laterally and medially, dividing the enclosed space into two compartments and incidentally providing an additional pair of articulating surfaces.

The three other ligaments, namely the spheno-mandibular, stylo-mandibular and temporo-mandibular are all extremely indifferent structures arranged in such a way that they have little control over the condyle in any except the posterior and lateral directions.

Fig. 4. An examination of the muscles surrounding the joint reveals a temporal of goodly proportions with a mean pull upward and backward and with inferior fibres running horizontally as in the lower animal forms. The masseter has two heads, a deep one running almost vertically to the upper portion of the external surface of the ramus and a superficial one running downward and backward to the lower half. The internal pterygoid might be called the internal masseter since it parallels the superficial portion of this muscle in its downward and backward course from the pterygoid process to the ramus. The external pterygoid arises by two heads; an upper from the great wing of the sphenoid and the adjacent portion of the squama of the temporal, and a lower which arises from the entire lateral surface of the lateral pterygoid lamina. The fibres of the two converge as they run backward and laterally to attach, the upper to the inter-articular meniscus and the lower to the front of the neck of the condyle.

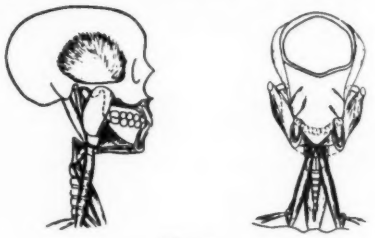

Fig. 4
Muscular suspension of the human mandible. (From "Dental Science and Dental Art," courtesy of Lea and Febiger Company.)

### Studies on the Movement of the Human Mandible

Someone once made the observation

that if an error or a misconception once crept into a text book it took fifty years to get it out. The fifty years have elapsed but the misconceptions about the movements of the mandible still appear in our most authoritative text-books. These hold that the supra-hyoid muscles, viz. the digastric, the genio-hyoid, mylo-hyoid and the genio-hyglossus are the muscles which open the mouth. This conception persists principally because these muscles appear to occupy the positions of greatest mechanical advantage for this function. This evidence is accepted in the face of contradictions of a functional nature. I should like to call attention to some of the evidence.

1. If the supra-hyoid muscles were actually the depressors of the mandible, why does not the condyle remain in the fossa, or even go further dorsally when the mouth is opened?

2. In those cases where paralysis strikes the masticating muscles on one side, why does the jaw in opening, swing toward that side?

3. In an attempt to open the mouth against a resistance, such as that of a chin strap, why does fatigue set in first in the region of the joint rather than in the region of the floor of the mouth?

4. Why should such an important joint as the temporo-mandibular be controlled in closure by one nerve trunk and in opening by two or three others? In all other joints of the body protagonists and antagonists are under the control of the same nerve.

## Methods Used in the Study of Movements of the Mandible

While there is quite a voluminous literature on the subject, it is largely foreign and has escaped general notice in this country. Most of the recent studies have been made with the roentgenological method, but there were several conducted before the advent of this aid, to which little has been added through x-ray research. I should like to speak briefly of one of these, namely, "On the Opening Movements of the Mandible and the Part Played by the External Pterygoid," by Chissin of the University of Bern, 1906.

Fig. 5. By means of a cleverly designed instrument composed of two interlocking bows, Chissin worked out the geometrical pattern of the opening movement. He selected two easily accessible mid-line points, namely, the junction of the incisal edges of the lower centrals and the middle of the chin-point and let a line connecting them represent the anterior surface of the mandible. Other points taken were the height of curvature of the condyle

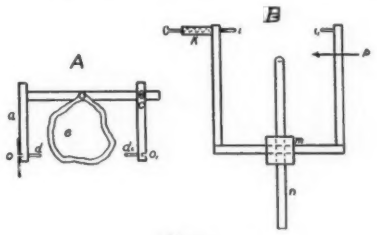


Fig. 5
Interlocking bows used by Chissin to study mandibular movements.

and the angle of the jaw. These two were determined in the closed mouth position as only in this position is relative accuracy possible. These four points were then laid out and a cardboard mandible was cut which was accurate in the relation of these four points.

Fig. 6. The face bow permitted of his taking the position of the first two points at any degree of opening. Following the plotting of these two readings the other two were obtained by merely bringing the cardboard silhouette into its correct relation with the two observed points. This method immediately proved that the opening movement

consisted of two separate and distinct types of movement:

1. A rotation around an axis as in a hinge, and

2. A translatory movement of the axis itself, whereby the mandible is actually shifted by migration of the condyle. Chissin broke the opening excursion into four phases, determined the position of each of his points at the beginning of each phase and at the end of the last and demonstrated that from the rest position the condyle moves down the articular eminence, passes its summit and in extreme opening goes ventral and even upward in front of the tubercle. At the same time the angle goes first sharply

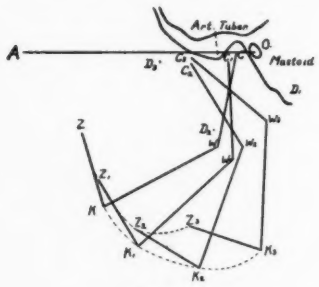


**Fig. 6**

Stages in the opening movements of the mandible. (After Chissin).

downward and backward and then begins to rise as it goes more markedly backward until at full opening it lies higher than in the rest position.

Having established the geometry of the movement Chissin examined the lines of force that would have to be operating in order to bring it about, and came to the conclusion that only a force acting near the neck of the condyle and in a downward and forward direction could give rise to this particular type of movement. He therefore turned directly to the anatomy of the part and Fig. 7 represents a diagrammatic drawing of a serial section cut antero-posteriorly through the joint.

It will be noted that the upper and lower portions of the external pterygoid are separated throughout the first half of their course and according to Chissin this separation persists through to their insertions, the fibres of the upper head going exclusively to the meniscus and those of the lower to the neck of the condyle. It should be recalled at this point that the meniscus, while riding free over the articular surface, goes down and attaches to the condyle itself, in back. The articular eminence alters the course of the meniscus and upper head so that it constitutes a pulley

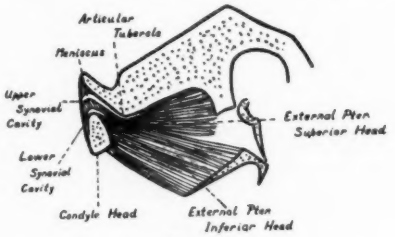


Fig. 7

Drawing of sagittal section through temporomandibular joint (after Chissin).

around which these combined structures work. The contraction of this part of the muscle, therefore, pulls the meniscus forward and since this is fastened to the back of the condyle, causes the condyle to roll and come forward. This head seems to be the one that is principally concerned with the first phase of opening, while the strong downward and forward gliding of the second stage finds the inferior part playing the major role.

The question might naturally be asked, why the joint should show characteristics that are so uncommon to other like structures. In answer it should be pointed out that were the opening movement a pure rotation around a point in the condyle, both the angle and the chin

point would go backward in opening considerably more than they do under this arrangement. See Fig. 4. The point should not be missed that the tongue, the larynx and the pharynx are all directly or indirectly attached and supported anteriorly at the symphysis. With this point dropping back there tends to be a crowding of these vital organs. By the simple expedient of pulling the condyle forward this is minimized in Man. In four-footed animals it is taken care of by gravity. The supra-hyoids, by increasing their tensions as the jaw opens, not only maintain the position of the hyoid bone in space but also lend further economy to the opening movement.

Chissin carried on other experiments with cadaver material and pointed out that such methods could be very misleading. Here he resorted to electrical stimulation on relatively fresh material and found that such stimulation of the supra-hyoids would bring about an opening of the mouth. The movement induced in this manner, however, was not similar to that seen in the living. The condyles did not leave the fossae and the hyoid bone was raised. When, on similar material, he stripped away all of the muscles of mastication except the external pterygoid, and subjected this muscle to the action of the current, he obtained the usual opening movements, although as might be expected, these were less in amount.

He made efforts to reach the muscle in the living, since it can be palpated with the finger if the mouth is wide open. When the mouth is closed, however, the muscle sinks back under a covering of tissue which must be penetrated and the narrow space afforded between the outer surface of the maxilla and the inner surface of the mandible with its associated musculature made this impossible.

Recently there has been a return to the mechanical approach but from a slightly different angle. Prentiss worked out the anatomy of the musculature, apparently in ignorance of Chissin's work and named the superior head of the external pterygoid the Spheno-Meniscus muscle. His contentions were almost identical with those of Chissin. Lord, at Prentiss' suggestion, has used a dry skull with holes drilled in it to receive cords. These cords follow the directions of the various muscles and Lord is able to move the mandible in all of the normal directions by pulling the various strings. A similar model, made of plaster, was demonstrated a few weeks ago in Chicago by Dr. Gromme of Cincinnati.

The other principal method that has been used in these investigations has been that of roentgenology and the outstanding piece of work is unquestionably that of Hildebrand. Time will not permit of a review of more than the essential points of his technique and a summary of his findings.

The difficulty of taking an undistorted x-ray of the joint lies in two obstacles:

1. The density of the surrounding bone and particularly that of the petrous temporal, and

2. The length of exposure necessary for penetration.

The latter difficulty has made serial pictures, or cinema-photography impossible. The mouth has been opened in stages and pictures taken at each step, but mechanical analysis has shown that this cannot be considered accurate because the condyle behaves differently when it is opening and the muscles of mastication are relaxing than when it is closing and these muscles are tensed. The condyle paths in opening and in closing are frequently quite different.

To get around these difficulties vari-

ous types of indicators have been used. By an indicator in this connection is meant an attachment usually fastened to the teeth in such a way that its movement may be studied by means of serial pictures. MacMillan's attachment to the teeth of cows is an example. If one can accurately determine the relation of such an indicator to the condyle he can determine the movement of the condyle by analyzing the movement of the indicator.

There are two very valid objections raised against this method by Hildebrand. If the indicator is made light, its vibrations while the subject is masticating are greater in range than some of the movements being studied. If

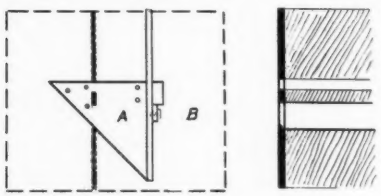


Fig. 8

Diagrammatic drawing of Hildebrand's frontal and vertical indicator. Figure on right represents type of record that would result from moving the cassette with the jaw at rest.

made heavy enough to obviate this objection, it influences the normal mechanical movements. These were the objections that Hildebrand sought to overcome.

Hildebrand's indicators were light in weight and made of gold, as this material casts a good shadow and has greater rigidity than lead. The design of that used for the study of frontal and vertical movement is shown in Fig. 8. The essential points to be noted are these. The vertical edge is made to coincide with the mid-line as indicated by the interproximal contacts between the mandibular central incisors. The top horizontal edge represents the occlusal level of the teeth, although it is fastened at a somewhat lower level to avoid the upper incisors. Since this distance may be accurately determined the readings can be readily corrected. In this position the indicator is fastened to the teeth by means of ligatures through the holes shown. The plate has a vertical slot cut in it and its distal edge is cut at an angle of 45°. Now if one were to make a very short exposure of this device with the ray directed from in back of the head and in the sagittal plane, he would obtain a picture of the entire indicator with a clearly defined rectangular spot in the center of a completely unexposed triangular area. Hildebrand next placed a sheet of lead in front of the indicator and this sheet of lead presented a vertical slot which cast the same width of shadow as the slot in the indicator. If a short exposure is now made there results a picture of the slot, certain portions of which are blocked off by the indicator. This picture corresponds to an individual frame of a movie film and constitutes one segment of the curve that is being graphed.

The curve was completed by an ingenious arrangement which caused the film cassette to travel across the opening at a pre-determined rate of speed. This was done by means of weights, carried in tubes on either side of the apparatus, the weight in one tube rising while the other was sinking through glycerine. This permitted a smooth and even movement at a speed that gave an exposure time of 1/20 of a second per frame. The resemblance between this arrangement and the focal-plane shutter of a speed-camera or the principle used in the Buckey diaphragm will be apparent. The tube was operated steadily throughout one excursion of the cassette at 80 K.V. and a mil-

liamperage that ranged from 25-35. By consulting the figure again one can visualize what type of image would be presented. The exposed and unexposed parts of the slot would now be drawn out into horizontal bands and we would have a kymographic picture of an organ at rest.

If the patient is now given food to chew and if the head is immobilized so that only the mandible can move our bands go into curves, or rather waves, and we have a kymographic representation of such movement. For interpretation this movement must be laid out on graph paper.

If the slot in the indicator ran horizontally and was long enough so that there was no jaw excursion where it could not be seen through the slot in the lead plate, our graph would present a wavy band with parallel edges. Such a picture could only be used for determining the extent of the jaw opening and there are far simpler means of doing this. Hildebrand wished to know not only the amount of jaw opening but that of lateral excursion, and the time during which these took place. This is the reason that his indicator has a 45° angle to it. The opening in the indicator can be seen only when the jaws are operating straight up and down. Under these conditions there are two bands, one above it and one below. The instant that jaw is moved laterally (Fig. 9) this opening is lost and the superior and inferior bands fuse. The height of this band varies as the jaw alters its position in the frontal plane, getting shorter, or better, thinner, the further the jaw travels from centric.

Now since the width of the slot is known, as well as the rate of speed of the film, it is possible to determine mathematically the exact course of the mid-line point of the mandible and to lay this course out in two planes, namely the vertical and the transverse. It will tell us nothing about antero-posterior or sagittal movement except that such movement must take place.

For the purpose of studying sagittal movement Hildebrand used the indicator shown in Fig. 10. Although different in design its use was identical except that the slot in the lead screen was disposed horizontally and the cassette was caused to move vertically in making the picture.

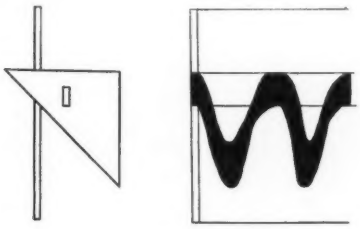

Fig. 9
Indicator and type of graph obtained when both cassette and jaw are in motion.

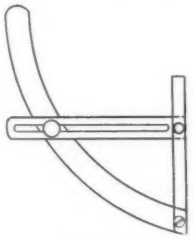

Fig. 10
Drawing of Hildebrand's indicator for the study of lateral excursions.

He now had his problem reduced to planes, and a mathematical analysis made it possible to figure the exact movements of the mandible and the time of their occurrence. This he studied on a number of subjects with various types of normal and abnormal occlusions and came to the following conclusions.

(I am taking the liberty of substituting

for some of Hildebrand's terms those in general use in this country.)

### "Empty" Sagittal Gliding

The curve followed by the lower incissors in straight opening is determined only by the over-bite of the front teeth, as long as the front teeth are in contact; in the non-normal cases the sagittal gliding curve is determined partly by the teeth which glide against each other, partly also by the inclination of the condyle path.

The condyle movement is about 10 mm., i.e. the condyle goes, as a rule, down onto the articular tubercle in ventral gliding.

### "Empty" Lateral Gliding

In cases with deep over-bite the curve in the lateral direction is determined entirely by the front teeth and canines; in other cases by both the teeth and the condyles. The appearance of the curve in the horizontal plane indicates that the character of lateral gliding, as in the opening movement, is that of a combined movement of rotation and displacement. The nature of this combination seems to be determined by the conditions of articulation.

The condyle on the non-functioning side as a rule, goes down onto the articular tubercle as in sagittal protrusion. The condyle on the functioning side as a rule, goes down onto the articular tubercle as in sagittal protrusion. The condyle on the functioning side moves somewhat laterally though not more than about 2 mm.; it also moves slightly ventrally but only exceptionally does it go dorsally.

### "Empty" Opening and Closing Movements

As a rule this curve reveals both rotation and displacement of the condyles. No definite rule was found concerning the positional relation between the opening and closing curves, sometimes one is ahead and sometimes the other.

### The Condyle Path

The condyle path commences on Camper's plane (connecting the wing of the nose with the external auditory meatus) about half an inch ventrally from porion, goes down over the tubercle and up on its ventral side, sometimes as far ventrally as dorsally, finishing approximately at Camper's plane. Since the height of the tubercle and the length of the dorsal part of the condyle path varies, the inclination of the path will also vary both for the right and left sides and from case to case. The average inclination is about 16°. The path usually has the form of a long drawn-out S. In opening movements the path is about twice as long as in protrusion or lateral gliding.

### The Lateral Movement in Mastication

The mouth is opened (after slight gliding of the lower denture against the upper and with some lateral movement) to a third or more of the maximal open position. The mandible is then moved obliquely upward and laterally, and usually to the side having the best conditions of articulation, to a maximal lateral position the distance of which from the median plane is rather more than half of the maximal lateral movement attained in "empty" lateral gliding. This lateral movement occurs during the second quarter of the closing movement. The mandible reaches the occlusal position after a gliding of the lower denture against the upper. The amount of this gliding depends on the inclination of the lateral gliding curve. A steep curve gives a more pronounced gliding than a less steep curve.

### Movements of the Teeth in the Sagittal Plane in Mastication

The curve of mastication in the sagit-

tal plane resembles, broadly speaking, the curve in the "empty" movements.

### Movements of the Condyles in Mastication

During the opening movement the condyles go downward practically side by side, not quite down to the top of the tubercle. When the mid-point swings aside the condyle on the non-functioning side goes down onto the tubercle in all likelihood medially; the other condyle, however, goes a corresponding distance backward and laterally until the mid-point of the arch attains its maximal lateral position. During the following closing movement the condyles make a simultaneous backward movement until the condyle on the functioning side has attained its dorsal position. When the mid-line goes to the occlusal position under gliding between the dentures this condyle passes medially to its starting position, while the opposite one goes dorsally and laterally to its starting position. The condyles in mastication never go ventrally to the tubercle.

### The Influence of the Kind of Food on Masticatory Movement

Hildebrand's investigations show very clearly that as a rule the nature of the food does not influence the appearance of the mastication curve in any respect, nor, consequently, the movement of the condyles.

### The Crushing and Grinding Movements

The crushing and grinding curves, in the main, resemble each other. Lateral movement seems, however, to be somewhat greater in grinding than in crushing. Gliding between the dentures, both protrusion and lateral, seems to be slightly greater in grinding than in crushing, but the difference is insignificant.

### The Influence of the Teeth on the Masticatory Movement

The teeth appear, as a rule, to exercise an influence on the choice of the masticatory side in such wise that the side is chosen where most teeth are in contact during lateral gliding, i.e. when there is best articulation. In cases where articulation is equally good or equally bad on both sides, mastication usually takes place on the right and left sides alternately. The teeth also determine the amount of gliding, so that it becomes greater when the gliding curves are steeper.

### Influence of the Masticatory Movement on the Teeth

Extreme wearing of the teeth cannot be considered to be caused by a masticatory movement suitable for wearing, so that the latter ought to have great lateral movement, and this be near the occlusal position. The masticatory curves of the abrasio group do not differ from those of the other groups.

### Summary and Conclusions

1. Studies of comparative anatomical forms show that in no animal below man is bilateral function possible. In all joints in the mammalia the musculature is the same, differing only in the relative development and the direction of the different muscles.

2. The temporal and the masseter are the chief closing muscles, whereas the pterygoids both internal and external, seem to be associated with jaw shifting. In the carnivora and rodents the masseter seems to assist in this function also. In the herbivora the external pterygoid begins to assume a more oblique direction and here, because of the looseness of the joint, brings about a rotary motion toward the functioning side.

3. In most animal dentures the ar-

rangement of the teeth is such that when function is performed on one side the opposite side is completely lingual to its antagonist.

4. In Man the joint is so controlled by the external pterygoid that the contraction of the two heads of this muscle causes a combined rotary and shifting motion. This brings the condyle down onto the articular eminence on the non-functioning side, while the opposite condyle remains in a more posterior position.

5. Since Man is said to be the only animal possessing an articular tubercle and since a straight horizontal pull would shift the jaw equally well, it would seem that the role of the tubercle is to disarticulate the non-functioning side and throw the entire weight of occlusion to the functioning side. If this is the case it places Man with the animals insofar as unilateral mastication is concerned.

6. It will thus be seen that the right joint controls function on the left side while the left controls function on the right. This is a very important point in diagnosis, and the course followed by the mid-line of the mandible in straight opening and closing should be carefully noted.

7. The picture that one gains from a study of the movements of the joint is that it is entirely different from the mechanics of the other joints of the body. Whereas in most joints the articular surfaces and the ligaments seem to predetermine the course of movement, we have in the temporo-mandibular joint an arrangement which reduces both of these factors to insignificance. The mandible in Man seems to be hung in a cradle of musculature, which musculature shows great variations in its behavior pattern between individuals and even between the right and left sides of the same individual. Since behavior patterns are matters of nervous reflex arcs it becomes apparent that any considerable change in the status quo of any denture must be accompanied by severe readjustments of the entire nervous control of the part.

8. A review of the scientific investigations on the joint reveals that many clinical procedures are based upon empirical ideas and they also reveal that we have as yet no satisfactory method of clinically studying the joint condition.

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# THE PHYSIOLOGY OF THE HUMAN PERIODONTAL TISSUES UNDER NORMAL AND ABNORMAL OCCLUSAL CONDITIONS*

*By* RUDOLF KRONFELD, M.D., D.D.S.

WITHIN THE SCOPE of this symposium it is my privilege to discuss the morphology and physiology of the human periodontal tissues under normal and abnormal functional conditions. In doing so, I would like first to mention a fact which is perhaps known to some of you but which is likely to be overlooked by many.

Our essential knowledge of the periodontal membrane—its structure, its development, its physiology, and its adaptation and regeneration—goes back to a small monograph, which this year is celebrating its golden jubilee. I am referring to G. V. Black's monograph on the periosteum and the peridental membrane which was published in Chicago in 1887. Dr. Black had histologic preparations from the jaws of cats, sheep, and pigs, and on these he made a systematic study of the distribution and course of the fiber bundles of the periodontal membrane, classified them, and gave them the names which we are still using today.

What, then, is the progress that has been made in this field since the days of Dr. Black? The greatest advancement since his time has been the general use of *human* tissue sections for the study of the supporting dental structures. It was not until about twenty years ago that illustrations of the human periodontal membrane began to appear in dental literature. Before, everything had been illustrated with animal tissues. It was only about fifteen years ago that the first attempts were made to evaluate the occlusal conditions in specimens of human jaws and to analyze the corresponding changes in the supporting tissues of the teeth. Gottlieb and his collaborators were leaders in Europe in this field; and in the United States and Canada this type of investigation has been carried on by Box[1], Coolidge[2], Lundquist[3], Orban[4], the essayist[5], and others. These studies taught us to understand, first of all, the individual variations in the arrangement and structure of the periodontal membrane in different human teeth. Then we learned to distinguish morphologically between the periodontal membrane of a tooth subjected to heavy function and that of one out of occlusion. Finally, we were able to recognize the direction of the occlusal stress from the distribution of the periodontal membrane fibers and from other tissue changes, so that in looking at a section through a human tooth *in situ* we could tell whether this tooth had been in end-to-end occlusion, or whether it had been subjected to stress in a more lateral (horizontal) direction.

The following pictures will serve to illustrate the most important types of periodontal membrane and alveolar bone that we find in our specimens.

Fig. 1A shows a buccolingual section through the lower left first bicuspid of a man of 51 years. As can be seen from the photograph of the articulated jaw

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1. Int. J. Ortho., 19, 574, 1933.
2. J. A. D. A., 18, 499, 1931.
3. J. A. D. A., 24, 1577, 1937.
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specimens (Fig. 1B), the tooth was in end-to-end occlusion. The occlusal surface was worn flat. The gingival tissues appeared normal. In the section we note a strong, well-developed alveolar process. The buccal and lingual bone plate are about equally thick. The periodontal membrane is of even width all around the root, with strongly developed fiber bundles running from cementum to bone. The gingival tissues are attached to the cementum, below the cemento-enamel junction, a condition which can normally be expected in a man of 51 years. There are no crevices present, and the gingival epithelium is intact.

Fig. 1C shows the strongly developed principal fibers on the lingual side of the root. These fibers, located near the alveolar crest, run horizontally from the tooth to the bone. Their function is to stabilize the tooth against lateral dis-

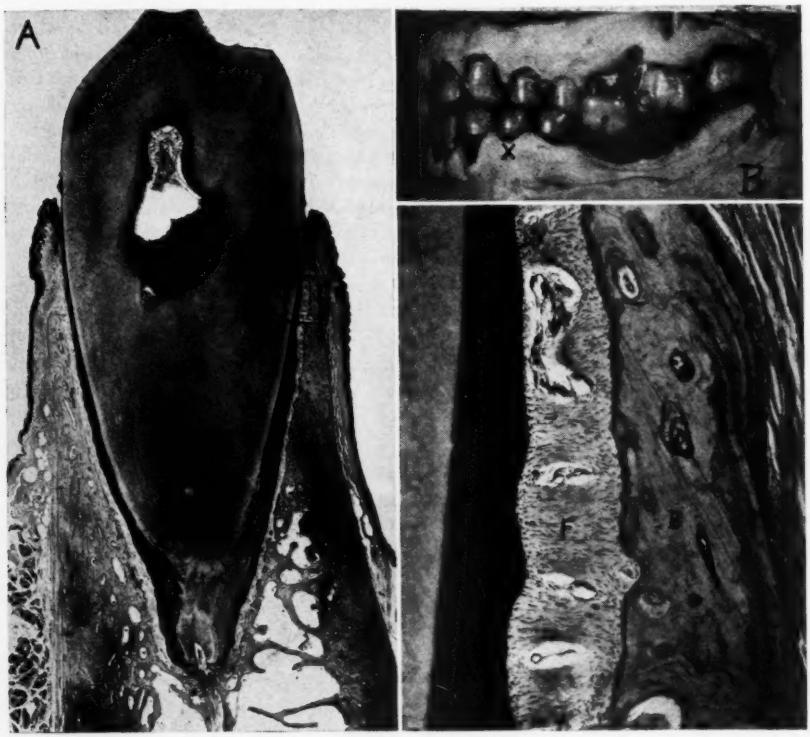


Fig. 1

A. Buccolingual section through the lower left first bicuspid of a man of 52 years. Normal supporting tissues: well-developed, strong alveolar process, fibrous periodontal membrane, and healthy gingivae. (Willman, Periodontia, National Medical Book Co., 1938.)
B. Photograph of jaw specimen. The bicuspid, marked x, is worn flat and is in end-to-end occlusion.
C. Higher magnification of area marked by square in Fig. 1A. Alveolar crest on the lingual side. The tooth is anchored to the bone by strong horizontal fiber bundles. The thickness of the periodontal membrane is about 20 mm. C, cementum; F, fiber bundles of the periodontal membrane; B, alveolar bone.

placement, and especially to counteract any attempt to force or tip the crown in a buccal direction.

The apical foramen of this tooth is surrounded by the apical fibers of the periodontal membrane which serve a double purpose: they act as a cushion when the tooth is pressed down into the socket, and they prevent lateral displacement of the apex when the crown is moved under stress. This apical anchorage acts as a protection to the delicate bundles of vessels and nerves passing through the apical foramen, which otherwise might be injured by sudden excursions of the apex.

We shall now compare this tooth with the upper right first molar of the same individual. This molar obviously was without an antagonist for a long time since its occlusal surface is worn hardly at all; moreover, it had extruded from its socket to a level about 3 mm. below the present occlusal plane (Fig. 2A). The periodontal membrane of this molar is thin and atrophic (Fig. 2B); only a few fiber bundles are present, and they are separated by wide areas of loose indefinite fibers. This condition of the periodontal membrane is typical of a tooth without antagonists (see also Fig. 4, right); it is most marked in fully embedded teeth which are not subjected to any functional stresses and which, therefore, have periodontal membranes showing no evidence of activity (Fig. 3).

Special attention should be called to the variations in the thickness of the periodontal membrane. Several reports have appeared in foreign dental literature dealing with this subject. In this country the first systematic measurements of the human periodontal membrane were reported by Coolidge.[6] His report was based on more than 1100 individual measurements, all made on teeth with known functional conditions. On the whole, the average human periodontal membrane varies in thickness from 0.21 mm. in young individuals to 0.18 or 0.15 mm. in adults. Coolidge found that whereas there is considerable variation in the thickness of the periodontal membranes of different individuals, yet within each jaw the functioning teeth invariably have a thicker periodontal membrane than the non-functioning ones. To give an example: the average thickness of the periodontal membrane of a lower left second molar in heavy occlusion was 0.22 mm. and that of the corresponding right molar which had no antagonist was 0.13 mm. (Fig. 4).

Fig. 2

A. Photograph of same jaw specimen as shown in Fig. 1B. The upper right first molar (x) has no antagonist, is not abraded, and has extruded from its socket. Its periodontal membrane is shown in Fig. 2B.

B. Periodontal membrane of the upper right first molar. It is thin and atrophic; only a few weak fibers are present. The thickness of the periodontal membrane is about 0.14 mm. C, cementum; PM, periodontal membrane; AB, alveolar bone.

6. J. A. D. A., 24, 1260, 1937

Fig. 3
Periodontal membrane of a completely embedded lower third molar. It shows an advanced degree of atrophy due to inactivity. It consists of a layer of thin fibers arranged parallel to the root surface. D, dentin; C, cementum; PM, periodontal membrane; B, bone. (Logan, W. H. G., Jour. Amer. Dent. Assn., June, 1937.)

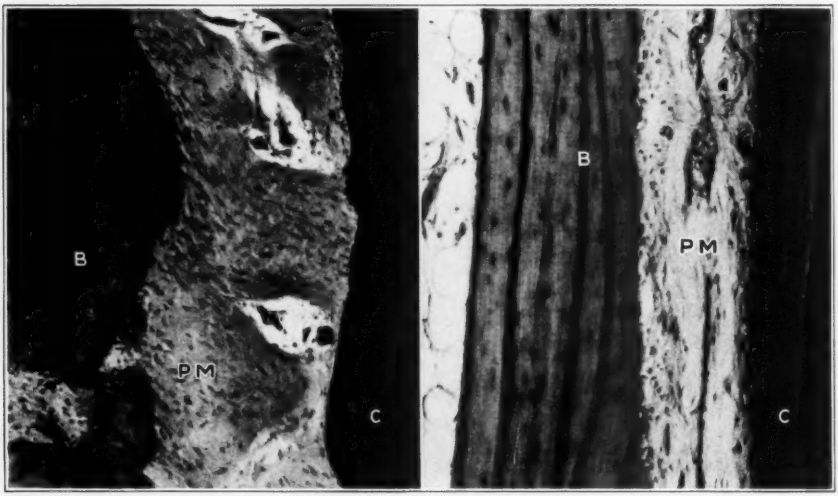


Fig. 4
Comparison between the periodontal membrane of molar in heavy occlusion and molar without antagonist. Left: Periodontal membrane of molar in heavy occlusion. C, cementum; PM, periodontal membrane; B, alveolar bone.
The periodontal membrane, which is strong and fibrous, is 0.22 mm. thick. Right: Periodontal membrane of molar without antagonist. C, cementum; PM, periodontal membrane; B, alveolar bone. The periodontal membrane, which is weak and atrophic, is 0.13 mm. thick. (Coolidge, E. D., Jour. Amer. Dent. Assn., August 1937.)

Thus, we know definitely that a thick periodontal membrane with strong principal fiber bundles is characteristic of a tooth in occlusion, and a thin, atrophic periodontal membrane characteristic of a tooth without antagonists or of an embedded tooth.

The changes in the supporting tissues are not confined to the periodontal membrane. The alveolar bone, to which the masticatory stresses are ultimately transmitted, also adjusts itself to the prevailing functional conditions. The alveolus around occluding teeth is well developed, with strong trabeculae of bone reenforcing the socket. If there is additional occlusal stress, the number and size of the trabeculae are increased, and the bone becomes denser and stronger. Conversely, if the amount of function is decreased, some of the supporting bone is lost. These bone changes are visible in the radiograph; particularly striking are the reenforcement and condensation of the bone around the roots of bridge abutments and the atrophy and loss of bone around teeth without antagonists.

The changes in periodontal membrane and bone are, to some extent at least, reversible, a fact which is of great clinical significance. To take a hypothetical case illustrating this: In the mouth of an adult with thirty-two intact teeth in good occlusion, all teeth have a uniform, well-developed periodontal membrane of an average thickness of about 0.18 mm. If both lower first and second molars were extracted, and perhaps in addition some of the anterior teeth were lost, the result, so far as the periodontal membrane is concerned, would be the following: The thickness of the periodontal membrane of the upper first and second molars, which have lost their antagonists and consequently are subjected to a greatly reduced stress, will be decreased to around 0.13 mm. This reduction will be caused by apposition of bone and cementum, which will in turn narrow the space around the root. At the same time these teeth will gradually move out of their sockets, while new bone is filling in at the fundus of the alveolus. The periodontal membrane will lose most of the principal fiber bundles and present the histologic picture of atrophy, as illustrated in Fig. 2B and 4, right.

The third molars, having to sustain an increased functional load, will undergo a change of an opposite nature. In time, they will show an increased thickness of the periodontal membrane, averaging from 0.20 to 0.25 mm. The space for this increase will be created by bone resorption along the alveolar walls. The periodontal membrane will become reenforced by the development of additional fiber bundles (Fig. 4, left).

Next, the question arises: What would happen if a partial denture were constructed to replace the missing lower molars and restore occlusion for the upper molars? Although we have no actual evidence to answer this question, yet we are in a position to reconstruct a fairly accurate picture of what changes would, in all probability, take place. The atrophic periodontal membrane of the upper molars would probably become wider again, and new fiber bundles would develop under the stimulus of function. Thus, the upper molars would again be reenforced to withstand occlusal stress.

Corresponding changes will be found in the bone supporting these teeth. Loss of function will be followed by a loss of supporting bone, whereas increased function will result in bone formation and reenforcement of the alveolus.

This adaptation of the periodontal tissues cannot always be predicted with certainty. Some teeth apparently can adjust themselves to almost any condition: they can support a greatly increased amount of stress without any clinical or histologic evidence of damage. Other teeth seemingly cannot tolerate

such a condition and become sore and loose and may eventually be lost unless the stress is relieved. Constitutional factors, as yet largely unknown, play a deciding role here. Age is doubtlessly of some significance; the jaw tissues of younger individuals respond more readily and more efficiently to changed occlusal conditions than those of older ones. Beyond this, very little is known about the factors that control this tissue response.

The following figures will illustrate the condition of the supporting tissues in teeth that were subjected to abnormal occlusal conditions. Fig. 5A shows a lower third molar markedly abraded and in heavy end-to-end occlusion. The lower first and second molars are missing, and, as a result, the third molar is tipped forward and at the same time is drifting mesially (Fig. 5B). This position of the tooth necessitates a particularly strong anchorage on the distal side of the distal root, near the alveolar crest. Very strong fiber bundles run horizontally from bone to tooth (Fig. 5C). In this way, the tooth is reenforced to withstand the forces which tend to tip it mesially. At the time of the death of this individual the molar showed no evidence of damage; the supporting tissues had made a satisfactory adjustment to the existing occlusal conditions. However, this does not mean that such an adjustment is necessarily permanent: loss of additional teeth, advancing age, or some constitutional change might later have upset the equilibrum between occlusal stress and

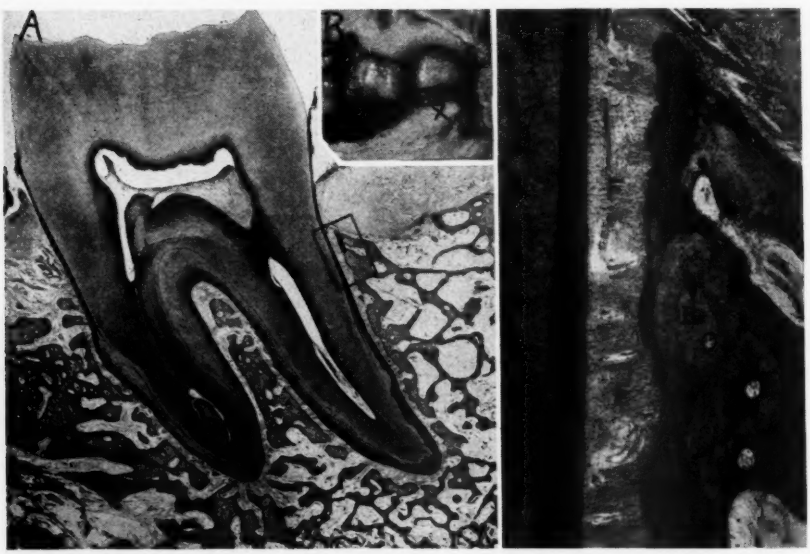


Fig. 5

A. Lower left third molar in heavy occlusion, with a tendency to tip and drift mesially. Healthy periodontal membrane and strong, well-developed bony support around the tooth.
B. Photograph of jaw specimen. The lower left third molar (x) is in end-to-end occlusion with the upper third molar.
C. Higher magnification of area marked by square in Fig. 5A. Distal alveolar crest. The root is suspended from the compact alveolar process by strong horizontal fiber bundles. F, fiber bundles of the periodontal membrane; B, alveolar bone.

Fig. 6
Lower left first and second bicuspids of a man of 64 years. The second biscupid is tipped mesially and much abraded. The direction of the occlusal force to which this tooth was subjected is indicated by arrows in the radiograph in the upper left corner. R, area of root resorption on the side of pressure.

tissue reaction, and the tissues might have been damaged. As a prophylactic measure against possible later loosening of the tooth, an artificial restoration is indicated to relieve some of the heavy load carried by this third molar.

Fig. 6 shows a lower second bicuspid which is very much abraded and has been tipped mesially. In this position the occlusion caused the tooth to move like a lever of the first kind, as indicated by the arrows in the radiograph in the upper left hand corner of the illustration. The apex shows a definite deviation toward the distal side, the direction opposite to that of the crown (Fig. 7). On the side of tension the periodontal membrane is only about one-half as thick, and there are few fiber bundles. There is evidence of pull on the distal side of the root and signs of traumatic pressure injury on the mesial side (Fig. 6, R). The mesial root surface shows resorption over a considerable area. The periodontal membrane has been crushed between root and bone and has lost its normal structure. The adjacent first bicuspid shows corresponding tissue changes, though to a lesser degree.

The traumatic injuries to which the human periodontal membrane is subjected in cases of excessive stress, especially stress in a lateral direction, are compression and crushing of the soft tissue between tooth and bone, resorption of the alveolar bone, and resorption of the root. All of these changes have one thing in common, namely, that they

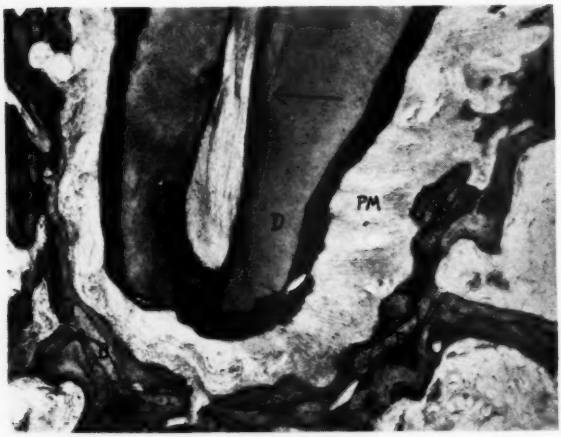


Fig. 7
Higher magnification of the apex of the second biscupid shown in Fig. 6. The direction of the prevailing occlusal force is indicated by an arrow. The periodontal membrane is thick on the side of pull (right) and thin on the side of pressure (left). On the side of pull, the principal fibers are taut; on the side of pressure they are relaxed. D, dentin; PM, periodontal membrane; B, bone.

have a tendency to be repaired and the damaged tissues to become regenerated when the excessive force subsides (Cooldige[7], Orban[8], Stuteville[9]). Only if the trauma persists for a long period of time, or if the tissue resistance is unusually low, will the tooth become loosened.

In summarizing, we can state that the periodontal membrane and supporting bone of human teeth have a wide range of adaptability to changing functional conditions. This permits the periodontal tissues to adjust themselves to a variety of abnormal and unfavorable occlusal relations and to maintain such relations successfully over a long period of time. However, there is always the danger of a decrease in tissue resistance and the ensuing danger of an overloaded tooth's becoming loose; therefore, it should be the aim of good dentistry to keep the dental arches intact and the occlusion undisturbed.

1757 W. Harrison St.
Chicago, Ill.

7. J. A. D. A., **25**, 343, 1938.
8. J. A. D. A., **15**, 1004, 1928.
9. J. A. D. A., **24**, 1494, 1937.

*(The fourth installment of the symposium on "Occlusion" will appear in the February Issue.)*

# IMMEDIATE COMPLETE DENTURE RESTORATION

*By* JAMES H. PEARCE, A.B., D.D.S.

AN IMMEDIATE RESTORATION is one that has been previously prepared and is inserted in the mouth just after the remaining natural teeth have been removed. Although the immediate denture idea is not a new one, a great deal of interest is being shown at the present time concerning this type of restorative work. Some of the advantages are listed as follows:

1. The principal advantage concerns esthetics. Such a procedure makes it possible for the patient to avoid the embarrassment of being entirely without teeth, even for a few days.
2. The function of mastication is disturbed less than after the usual period of waiting.
3. Immediate denture service is a substantial health measure, for people are more willing to have diseased teeth removed when they know they can be replaced at once.
4. The alveolar process usually develops into a more substantial foundation for the supporting of dentures in the future. Less rapid resorption of the alveolar ridge is the usual result. The protective covering offered by the denture also prevents particles of food from getting into the open sockets and helps to avoid injury to the healing tissues.
5. The procedure will permit all the muscles of mastication and expression to function with little interruption. The temporomandibular articulation will not be disturbed or caused to change.
6. As compared with hastily making a denture as soon as all teeth have been removed, an immediate denture may be constructed more leisurely and, for this reason, is apt to be a better denture in every respect.

## SUGGESTIONS FOR IMMEDIATE DENTURE WORK

If both upper and lower dentures are to be made, it is recommended, wherever possible, that they be constructed separately. The upper denture should be inserted first and, after about three weeks' time, the lower denture should be constructed and placed in the mouth. The reasons are to avoid shock to the patient, which might be caused by removing too many teeth at one time, and to give the patient the advantage of becoming accustomed to the upper denture before the lower one is constructed.

In all cases, it is recommended that the posterior teeth be removed, leaving only the anterior teeth, and the mouth permitted to heal perfectly before construction is started. During the course of the surgical work, a case history, diagnosis and prognosis should be made and this information recorded for future reference.

The technique has been developed so that, in an average case, all impressions and records necessary for completion of the restoration may be obtained during one sitting.

The first appointment should include:

1. *An impression of the edentulous ridge,* adjacent structures and remaining natural teeth of the arch

for which the immediate restoration will be made. The preferred impression procedure may be either of the following:

A. *A sectional compound method.* A special tray of soft metal is shaped and formed over the study cast, so it will fit the mouth perfectly. Such a preparation is a definite advantage as a stepping stone to the making of a correct impression by this method. The tray is so prepared that it will include all the palatal surface, the edentulous ridges in the posterior and the lingual surfaces and incisal edges of the anterior teeth. It will extend, along the flange, as far forward as the cuspid teeth and eminences will permit. This will enable the operator to take the entire impression, with the exception of the small labial section, in one piece, as a regular compound impression. A sufficient amount of softened modeling compound is placed in the tray and the indicated form given to the mass by finger manipulation. Care should be taken in the shaping to have a palatal prominence or mound and also reasonably high and thick flanges. After chilling the flanges somewhat, the entire mass is resoftened and glazed with an alcohol flame, quickly tempered in warm water and carried to place in the mouth. The impression is thoroughly chilled and then removed. At this time, all excess material is trimmed away with a knife, so that the thickness of the flanges will be reduced to a dimension of four millimeters. After establishing occlusal support between the compound rim above and natural teeth below, suction and muscle trims are obtained by the regular closed-mouth method. The edges of the impression, against which the labial section will be fitted in the mouth, are trimmed very sharp and definite, so that the impression may be properly assembled outside the mouth. A special soft metal tray is now used as an aid in taking the labial section of the impression. Compound is placed in the tray and the softened mass applied to the labial surface of the ridge and teeth. (Note: The large section of the impression is held in place by the occlusion while the smaller labial part is being made.) A labial frenum trim is now done, asking the patient to pull the lip down by muscular effort, and thus molding the softened compound material. Relief areas are designated for the median hard area, the incisive foramen, and right and left posterior palatine foramina. The post-dam is accomplished by adding soft, black wax to the impression surface. (Note: The material for the post-dam is not molded in the mouth.) This completes the upper impression by the sectional compound method.

B. *An elastic compound method.* This type of impression is, of course, made in one piece and, because of the elasticity of the material, can be entirely successful with careful procedure. A stock tray is used and should be very carefully selected. The

plastic material is shaped in the tray and carried to place in the mouth. This type of impression should be held in position in the mouth for about four minutes to permit the compound to flow properly and then partially chilled before removing.

2. *An Impression of the Teeth in the Opposing Arch.* Pink wax is the material of choice, a soft roll shaped into the form of a shallow tray being used for this step. The material is easy to use, requires no chilling in the mouth and, if handled properly, is very dependable. The cast of the teeth is made in artificial stone.
3. *Positional Relations of the Jaws.*
   A. A face-bow record is taken for mounting the upper cast correctly on the articulator.
   B. A centric record is taken in pink wax and is used to attach the lower in correct relation to the upper.
   C. A protrusive record is made in order to determine the proper condylar indications on the articulator.
4. *The Shade or Shades of the Teeth.*
5. *Attention to the Median Line and the Vertical Dimension.*

THE LABORATORY PROCEDURE SHOULD INCLUDE:

1. *Completing the reliefs in the upper impression, boxing in both upper and lower impressions and pouring in artificial stone.*
2. *Mounting the upper and lower casts on the articulator.*
3. *Completing the tooth selection.* This will mean selection as to type, form and size.
4. *Adapting a shellac base to the working cast.*
5. *Setting the teeth.* The anterior teeth are placed in pink wax, usually following the plan of removing three teeth; central incisor, lateral incisor and cuspid on the same side. The remaining three teeth on the cast are used as a guide in placing the porcelain teeth.
6. *Waxing and festooning.* Following the setting of the posterior teeth, the case is properly waxed, carved and festooned.
7. *Processing the denture.* The denture is processed in the chosen material and finished. An important consideration in the finishing of any denture is to be sure it has a well rounded and polished periphery.

THE SECOND APPOINTMENT SHOULD INCLUDE:

1. *Removing the remaining natural teeth,* using a local anesthetic. The complete and conscious cooperation of the patient is not only desirable but absolutely necessary. Therefore, any case that requires use of a general anesthetic for the extraction of teeth is considered undesirable for an immediate denture procedure.
2. *Inserting the immediate denture in the mouth of the patient.* The denture is thoroughly cleansed with soap and water before placing in the mouth.

INSTRUCTIONS TO THE PATIENT

The patient should be instructed:

1. *As to how to remove the denture.* He is told to remove and cleanse the denture three hours from the time he leaves the dental office. This is to be repeated several times during the first twenty-four hours.
2. *To wear the denture at night,* as well as during the day, for three weeks. After this period of becoming accustomed to the denture, it

(*Concluded on page* 46)

# The Illinois Dental Journal

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## • EDITORIALS •

### A CHANCE FOR AN ARGUMENT

In St. Louis last October, the chairman of the A. D. A. Committee on Amendments to the Constitution and Administrative By-Laws was droning his report to the apparently uninterested House of Delegates, pausing now and then as he moved the adoption of this or that amendment while the chair put the question. Shortly, he arrived at a point of greater interest, his voice became more resonant, the House became quiet and listened with eyes and ears to the front. He was reading an amendment sponsored by the Board of Trustees that proposed a two-dollar increase in the Association's yearly membership dues. As he finished, the President announced that it would be necessary for this amendment to lay on the table until the next annual meeting. Much whispered comment ensued. This writer exhaled an audible whistle and remarked to his neighbor, "This will give a chance for a year of lively argument."

In the January issue of *The New York Journal of Dentistry* appears an editorial by Jerome H. Trier, outgoing president of New York's First District Dental Society, entitled, "What Price National and State Representation?" The essence of the message is that "definite sentiment should be aroused against this increased taxation," the "increased taxation" referring, of course, to the proposed two-dollar increase in A. D. A. dues. The principal arguments used by Dr. Trier are that "increased taxation is incompatible with increased membership under the present economic strain" and "it appears that the House of Delegates expects the district societies to meet this increased obligation without raising the dues."

We are reliably informed that the Ohio State Dental Society, at its recent meeting held in Cleveland, voted at first to instruct its 1939 A. D. A. delegation to oppose the proposed raise in dues but later rescinded the action and finally decided to permit its delegation to go uninstructed.

So, you see our prediction was warranted for the argument has already started. We, like all good editors, enjoy nothing better than a hot argument providing there is some sense to it and since two dollars is still 200 cents we have decided to open a few pages of the JOURNAL, from now until the issue is decided, to those members who desire to discuss the pros and cons of this proposed amendment. As a starter we say that at present we favor the amendment and offer three points to support our position.

First: We understand that to meet the present A. D. A. budget will require the selling of some securities from the reserve fund since the anticipated income is less than the estimated expenditures. Such a procedure, if continued, would be economically unsound.

Second: We believe that dentistry needs a stronger central organization, one that can lobby efficiently either for needed legislation that will protect the interests of the public against the charletan or against proposed legislation that would tend to reduce the present high standards of American dentistry. This would necessarily involve greater expenditures and therefore greater revenue.

Third: We believe that the association should extend the activities of many of its present commissions, committees and bureaus such as the Research Commission, the Bureau of Public Relations, the Economics Committee and the Journal Committee. This also would demand a greater outlay of association funds.

It is agreed then, that here is a chance for an argument. Will you accept this offer to have your say in print where it will do the most good for your national organization, or will you remain silent until after the decision is made and then grumble at whatever that decision may be?

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## LAWRENCE W. (LARRY) NEBER

Continuing our editorial "Who's Who" of the State Society Officers and Committees we present the Chairman of the Study Club Committee, Dr. L. W. Neber of Springfield. If you will look well at the picture which graces the first page of this issue you will be quite prepared for the biographical sketch that follows.

Lawrence W. (Larry) Neber was born on a farm near Carterville in southern Illinois on June 14, 1897. His early education was obtained in a rural school and at the University High School at Carbondale. During his high school days he became quite prominent for his ability as an athlete—football, basketball and track being among his specialties. After graduation from high school be matriculated at the Southern Illinois Teachers' College but during his freshman year enlisted in the aviation branch of the army for the duration of the World War. Upon completion of his ground school course at the University of Illinois he was stationed at Camp Dix, Dallas, Texas, from where he was transferred to Kelly Field and commissioned a second lieutenant. Later he was stationed at Hampstead Field,

Garden City, Long Island, and was awaiting orders for active duty overseas when the Armistice was signed.

For three years following his discharge from the army Dr. Neber continued in aviation, commercial aviation, and flew most of this country, especially the middle-west, in barnstorming tours. During this period the young aviator became engaged and on June 16, 1919, married Miss Lucille Watt. In 1921 he decided to complete his course at Southern Illinois Teachers' College and graduated from that institution in 1922. Believing he preferred dentistry to aviation, he entered the University of Illinois, College of Dentistry and received his degree, Doctor of Dental Surgery, in 1926. While in dental school Dr. Neber became affiliated with Psi Omega Fraternity.

After satisfying all demands of the Illinois Board of Dental Examiners Dr. Neber moved to Carbondale, opened a dental office and practiced his profession there during the next four years. In 1930, he moved to Springfield and assumed the duties of Superintendent of Mouth Hygiene with the State Department of Public Health and during his tenure of office did a great deal to arouse an interest in dental health among Illinois school children and their parents. In 1933 Dr. Neber again entered the private practice of dentistry, this time in the city of Springfield and in 1934 restricted this practice to the specialty of orthodontia.

Dr. Neber's service with the State Department of Public Health imbued him with the idea that the State Dental Society had need for many refresher courses, especially in the field of children's dentistry and so, when he assumed the duties of the Chairman of the State Society's Study Club Committee in the spring of 1937, he brought to the office a knowledge of the needs of the membership along this line. Those who have worked with Dr. Neber or received instruction at one of the down state study club classes can testify as to his fitness for leadership in the activities of our society.

Dr. and Mrs. Neber have one daughter, Donna Elizabeth, who was born in 1921 and is now a senior in the Springfield High School. Like the other men who have received mention on these pages, Larry has an avocation, the collection of rare old glass-ware and furniture. It is rumored that he also still loves aviation and follows its development with keen interest.

The Illinois State Dental Society can be justly proud of such a member as Dr. Neber and to have this energetic, cooperative individual as chairman of one of its most important committees is a great stimulus to the entire organization.

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## SEVENTY-FIVE YEARS

A New Year, 1939, is dawning and it is hoped that it will be one of great happiness and prosperity for the Illinois State Dental Society and each of its members. We, as individuals, as a society, and as a nation, must banish any reflections of our past disappointments and look forward with renewed hope and energy for there remains yet the joy of living.

Your Society closed the year 1938 with the largest number of members in its history, indicating its worthwhile membership. The ideals to which the founders of this Society pledged their efforts have proved to be sound and we hope to continue their purpose.

The State Society has attempted to carry on from the point where the student emerged from college by encouraging his development along the lines of ethical practice and scientific research in order that finer professional ability and character would result. Advances in dental education, literature and organization have been in keeping with our yearly increase in age. To these ends the Society has justified its efforts. We have moved forward and will continue to do so if the same spirit is encouraged.

The problem foremost in our minds at the present time is the matter of social and economic readjustment. Both as a profession and as individuals we are in the midst of change. The answer to the problem is not as yet written but sufficient thought and action must be given to a solution so that the interests of all will be safeguarded. Certain fundamentals have already been established that will give material aid and every confidence is held that an effective solution will be forthcoming.

With the new year we turn our thoughts to the Annual Meeting at Peoria in May, our Diamond Jubilee. The reflections of seventy-five years, which for many is a life span, show a progressive professional growth of which we are all reasonably proud. Our profession stands upon a solid foundation, honored and respected. This heritage we must and shall maintain.

It is the hope of the officers and committeemen that this Diamond Jubilee Meeting shall observe in extraordinary manner the many milestones of progress. To that end all effort is being given to assure a program that will be in keeping and at the same time constructive. Each member owes to himself as well as to his Society a proportionate share of his time and effort. For that portion due the Society this year we ask that you plan now to help us fittingly celebrate this 75th Anniversary.

In the meantime place some renewed endeavors with those of your fellows into a program of advancement for your component society, thereby making it a bigger and better society, one in which you may have a greater pride in membership. Dental health information is eagerly sought by the public and we should disseminate that information which is based upon scientific facts and data. Much remains to be done and can be done if we become aroused to our responsibilities. Unity of thought and action will be of material value. After all, dentistry is your vocation and your future—the burden of accomplishment is upon your shoulders.

So, may I ask that each and every member respond wholeheartedly and make this year, the 75th Anniversary Year, the most outstanding in the history of the Society.

BEN H. SHERRARD, President.

# • HERE & THERE •

Dental extractions, paid bills, bee stings, castor oil and baldness are not so bad in retrospect as they were in contemplation; and now that the year nineteen hundred and thirty-eight is past, neither was it so terrible. If we have health, and even a modicum of wealth, we can say, "God is good," and depend on the rosy forecasts of the financial prognosticators for a happy new year. So, we say to you, a happy and prosperous new year—keep your chin up.

H & T

Charles M. Case, life member from the Chicago Dental Society, belies his sixty-six years. When he returned to his office to find a stranger calmly looting his safe he not only chased and caught the culprit but belabored, beat and bounced him up and down a bit until the police came. That's what a dental training will do for you.

H & T

As a brief commentary on what a wonderful thing modern civilization is we see by a recent news release that more Americans were married in nineteen thirty-seven than have been since nineteen twenty-three. This sounds wonderful until we read further to be informed that more Americans were divorced in this same year than ever before were divorced in a single year.

H & T

We but recently heard of the orthodontist who was so imbued with the Christmas spirit that he tied up all his patients with red and green ligature for the season. We presume that the next thing will be porcelain jackets and anterior denture teeth to match milady's evening gown, eye-shadow or lip stick. Say! Maybe we are missing a bet, friends?

H & T

An address, given by G. Walter Dittmar in 1933, while he was president of the A. D. A. reveals some very interesting data regarding the early history of organized dentistry. Before 1834 there were no dental colleges, no dental society and no dental laws in the United States, and less than 1,000 persons calling themselves dentists. In 1834 an association of dentists was formed in New York City. In 1840 a national convention of dentists was held in New York resulting in the formation of the American Society of Dental Surgeons. This organization lasted sixteen years and was finally dissolved by internal strife over the use of the then new material, amalgam, or as it was called, "mineral paste." In 1843 the use of amalgam was declared by the society to be malpractice. Between its inception in 1840 and the present day the organization now known as the American Dental Association had five complete reorganizations under various names. It is interesting to note that Illinois had quite a hand in reorganizing the A. D. A. to the form in which it now functions so effectively. In 1905 a committee composed of Arthur D. Black, A. H. Peck and G. Walter Dittmar completely revamped the Illinois

State setup, including its constitution and by-laws. Other states soon followed suit by reorganizing according to this Illinois Plan. These state reorganizations finally led up to the formation of the present American Dental Association in 1922, from the old National Dental Association.

H & T

N. D. Vedder (Michigan '01) is mayor of his home town, Carrollton; his campaign manager, H. H. Levi, never appears in public without his spats—it saves shoe shines. . . . Vance Carmichel of Chicago is quite a metallurgist. . . . M. R. Falstein (Illinois '36) wears a natty green tyrolean hat. . . . Earl Shepard of Edwardsville is a golfer, bowler, and (according to our informant) to a certain degree a night club singer. . . . Bob Walker commutes from Bloomington to Chicago for all Odontographic Society meetings. . . . Jim Mahoney of Wood River has no faults worth mentioning save one; in letter writing he is addicted to first filling the page from left to right, as is normal, and then filling in both margins from top to bottom. . . . Len Boke of Cicero was called by the affectionate name of "Dolly" while he was attending school. . . . There are two Places in Freeport, Eugene H. and W. H. . . .

H & T

One of the neatest bits of dental literature published recently is the booklet, "The Cost of Dental Care Under Health Insurance," put out by the Chicago Dental Society; the data in this booklet, marshalled by Peter T. Swanish, Ph. D., from the records of the Chicago Dental Society, was published by a committee composed of Harold Dillenbrand and Harold Oppice. According to figures in this booklet, any plan, such as health insurance, to take care of the actual dental needs of the population, would have to provide in round figures, 53.00 per year per capita.

H & T

The Journal of the American Dental Association greets the new year, we note, with a brand new cover; it's a very attractive one also, in our estimation. Apparently the smouldering question as to just what should be done with the name "Dental Cosmos" has finally been answered. With the January issue the Dental Cosmos disappears forever from the field of active dental publications.

H & T

The provisional Chicago Health Committee, an outgrowth of the recent Washington Health Conference, has to date held two public meetings. At the second of these meetings, fourteen program suggestions were presented to the gathering. For your edification we reprint several of these "Program Suggestions," picked at random from the list: 3—Expansion of free and conveniently located public hospitals and clinics. 10—Request that Council of Social Agencies make a complete study of the dental needs of Chicago. 11—The medical school to include more adequate training in these fields: (1) Public Health; (2) Industrial Hygiene and Occupational diseases; (3) Contraception, maternal, and child welfare.

Apparently what Chicago needs among other things is bigger and more convenient *free* hospitals and clinics, a social agency to tabulate dental needs, and lots more about contraception.

Wm P. Schoen. h.

• *DENTAL HEALTH EDUCATION* •

*A Department Conducted by the Committee on Dental Health Education of the Illinois State Dental Society and the Illinois State Department of Health*

*Edited by* CHARLES F. DEATHERAGE, D.D.S.
*Chief, Division of Dental Health Education, Springfield, Ill.*

# DENTAL HYGIENE IN PUBLIC HEALTH

*By* JOHN C. BRAUER, D.D.S., A.B., M.Sc., F.A.C.D.

*Director of the Bureau of Dental Hygiene, Head of Preventive Dentistry, and Professor of Pedodontics, State University of Iowa, School of Dentistry, Iowa City, Iowa.*

THE MANY DUTIES, responsibilities, and interests of the public health worker afford an unusual number of opportunities for success in the field of public health. The socio-economical problems of various sections and communities are obtained first hand through actual contact. These varied avenues of primary information, as well as the high professional position which the public health officers and nurses command in the community present them with many possibilities.

To be successful a public health worker must of necessity be a very versatile person. Comparatively few persons in any branch of human service have a wider range of personalities to meet. It is imperative that they have the respect and confidence of the various social levels, including the medical and the teaching professions. *The latter group, namely the educators, are realizing that education consists of much more than the teaching of grammar, arithmetic, or latin. They are realizing that a child first of all must know how to live.* One of the very first laws and objectives of life is to learn how to live and protect oneself. A sound, efficient body is essential to success and without this physical fitness, three or four academic degrees will mean little to the individual. *A child in the classroom, a potential 90% student, will frequently be a 70% student because of inability to concentrate.* This inability may be the result of a toothache, mouth infection, or lowered systemic reaction. The child may pass the grade in school, but during this particular year or period of time, one-fifth (more or less) of his fundamental education is lost. What handicap will this child experience in later life because of this deficiency? The situation cited is not fair to the teacher, the pupil, the parent, or the taxpayer. Often a physical deficiency exists wherein the child not only does not pass his grade, but repeats the offense, making the loss more severe to all concerned. *Education is cheating itself if it is not cognizant of these problems and their potentialities for success or failure. No*

*school large or small is immune to these actual happenings.*

Not only must the growing child suffer physical deficiencies from lack of dental or medical care, but the parent will lose financially. Neglect is much more costly than prevention. One can easily visualize a child sitting at a dinner table where his mother has placed a wonderfully prepared, well-balanced meal. The child because of aching or infected teeth cannot possibly chew the food correctly, and the result is the swallowing of food whole. This latter process cannot continue long before the bad habit is established of not chewing the food properly, resulting in the stomach and intestinal tract being affected. Frequently this condition leads to intestinal stasis, constipation, and the resulting sequela. This is only one aspect of the whole problem; another is the actual drainage of infection into the system. The oral tissues cannot be separated from the rest of the body. An infected non-vital deciduous or permanent tooth is just as dangerous as a primary source of infection in any sinus or tonsil. Bacteria from the oral structures may be just as virulent as from any other source in the body. All infected devitalized deciduous and young permanent teeth should therefore be removed unless the infection can be definitely controlled. In the event of early loss by extraction of the deciduous molars (foundation teeth) the space usually closes, thus pocketing in the permanent tooth which is beneath. This collapse due to early extraction may be avoided by placing a space retainer in the patient's mouth. If the latter is not employed, in most instances orthodontic treatment will have to be instituted to reopen the spaces, thus allowing the permanent tooth to erupt normally.

Having presented some of the reasons for the care of children's teeth and the results of neglect, the question arises, "What fundamentals in dentistry should the public health worker know to be prepared to meet these problems?"

It is particularly important that the nurse know something about the time the foundation teeth (deciduous teeth) and permanent teeth start to calcify and develop. Prevention is the keynote to success in dentistry and much can be done during the developmental periods. As early as the fourth to the fifth month of foetal life the initial calcification starts in the foundation teeth. It is as impossible to build strong, sound teeth out of inadequate diet as it is impossible to build a house with 5,000 bricks when 10,000 are needed. Calcium and phosphorus must be obtained from some source and the most common food is milk. Every expectant mother should be under the care and supervision of a competent obstetrician or physician. There are certain essentials in nutrition absolutely necessary, and the following may be considered the minimum requirement for every expectant mother. The following should be eaten EVERY DAY:

DIET FOR EXPECTANT MOTHERS

Milk—1 quart
Eggs—2
Meat, fish or chicken—1 serving
Fruit—twice daily—preferably fresh
Vegetables—2 servings daily (½ cup minimum)
  Class I—peas, carrots, beets, turnips, parsnips, onions, rutabaga, egg plant, squash.
  Class II—lettuce, spinach, tomatoes, celery, cauliflower, string beans, asparagus, chard, cabbage.
  Both vegetables may be chosen from Class II, but only one from Class I.
Cod liver oil—1 teaspoonful

Other foods to supply bulk and variety as desired.

Note:—The above diet is suitable for the lactation period with the exception that milk consumption should be increased to two quarts daily.

Shortly after the birth of the child, approximately at the age of six months, a number of the permanent teeth start to calcify. These are the first permanent molars, the centrals, cuspids, and the lower laterals. It is absolutely necessary that the child have an adequate intake of food, not only to develop the teeth but the body as a whole. Whenever possible a pediatrician or physician should be consulted who will prescribe a routine diet. The mother as well as the child should continue to be well fortified with the protective and tissue building foods. The mother who can nurse her baby will have a positive advantage. However, if that is not advised or is impractical, the evaporated milks supplemented with orange juice and cod liver oil will be satisfactory. It is essential that the child have at least a teaspoonful of cod liver oil a day or its equivalent all during the developmental period, which means up to and including the time of puberty. The following minimum diets have been recommended by Boyd and Drain.

DAILY DIET FOR AVERAGE CHILD[1]

(16 months to 3 years)

1 quart milk
1 egg (minimum)
4 to 5 ounces sieved vegetables
  Class I: tomatoes, spinach, string beans, cauliflower, asparagus, chard.
  Class II: peas, carrots, beets, turnips, rutabaga, squash.
  At least one vegetable should be chosen from Class I daily.
4 to 5 ounces sieved fruit
1 teaspoonful cod liver oil
Juice of 1 orange or 4 ounces of tomato puree
Meat (scraped beef, ground chicken, or liver) may be given two or three times weekly. It may replace the egg at dinner.

Other foods such as bread, cereal, and potatoes may be added to satisfy the appetite and maintain correct weight, *but under no circumstances should they replace any of the above.*

A variety of foods should be given so that the child will not form definite likes and dislikes. When teaching the child to take food he dislikes, give him a very small quantity the first time, gradually increasing the amount until he is eating a normal serving. Likes and dislikes are a matter of habit and care should be taken to teach the child to eat all the necessary foods.

Chewing should be encouraged by giving the young child dry toast daily and scraped or ground meat, or unsieved fruits and vegetables occasionally.

Undesirable foods: spices, coffee, tea, pop, popcorn, rich pastries, nuts, dried meats, dried beans, and fried foods.

SUGGESTED SCHEDULE

Breakfast:
  2 to 3 ounces sieved fruit (thoroughly cooked peaches, prunes, apples, or apricots—fresh, canned or dried)
  2 to 3 ounces cooked cereal (preferably oatmeal, Wheatena, or Ralstons) with cream
  1 glass milk
  ½ slice toast or 1 graham cracker with butter
9 A. M.:
  1 teaspoonful cod liver oil followed by the juice of 1 orange or 4 ounces of tomato juice
Noon:
  1 egg (poached, soft boiled, or cod-

1. The State University of Iowa: The College of Dentistry and The Department of Pediatrics cooperating.

dled) or 1 or 2 tablespoonsful ground meat
1 tablespoonful mashed or baked potato
2 or 3 ounces sieved vegetables
½ slice toast or graham cracker with butter
Simple custard, junket, sieved fruit or ice cream
1 glass milk

Supper:
Milk soup (vegetable puree with milk and butter)
Custard, cottage cheese, ground liver, or egg (if not served at noon)
2 ounces sieved vegetables
½ slice toast or graham cracker with butter
2 ounces sieved fruit
1 glass milk

A glass of milk should be given in the mid-afternoon or just before going to bed.

Cod liver oil may be given in the mid-morning or before going to bed. Allow no between-meal lunches except milk or fruit.

Note: This diet should be used as a guide, and may have to be altered to suit the case.

DAILY DIET FOR AVERAGE CHILD[2]
(7 to 16 years)

1 quart milk
1 or 2 eggs
1 serving meat, fish, chicken or liver
2 vegetables (½ cup is considered a medium serving)
Class I: lettuce, spinach, tomato, celery, cauliflower, string beans, asparagus, chard, cabbage.
Class II: peas, carrots, beets, turnips, parsnips, onions, rutabaga, egg plant, squash.
Both vegetables may be chosen from Class I, but only one should be chosen from Class II.
1 orange, apple or tomato
1 fruit in addition to above
1 teaspoonful cod liver oil
6 teaspoonsful butter

Other foods such as bread, cereal, and potatoes may be added to satisfy the appetite and maintain correct weight, *but under no circumstances should they replace any of the above.*

Potatoes, dried beans, and corn are not counted as vegetables. Sugar used excessively or cereal served more than once a day is likely to decrease the intake of more valuable foods.

Eating between meals, except fruit or milk, should be discouraged unless it is certain that the foods taken do not decrease the appetite at meal time. Tea and coffee should not be permitted. Rich pastries and highly spiced foods are considered undesirable. The use of candy or other sweets as dessert-accessories is unobjectionable.

Encourage the child to eat larger quantities of fruits and vegetables. Use a variety of these so that the child will not form definite likes and dislikes.

SUGGESTED SCHEDULE

Breakfast:
½ to ⅔ cup fruit (raw or cooked)
1 or 2 eggs
1 slice toast with butter
½ cup cereal with milk and sugar
1 glass milk

Noon:
⅓ to ½ cup tender meat, fish, chicken or liver
1 medium sized potato, mashed or baked
½ to ⅔ cup buttered vegetables
Lettuce, celery or other raw food
1 slice bread and butter
Simple pudding, ice cream or fruit
1 glass milk

Supper:
Egg, cottage cheese, liver or meat

2. Ibid.

## CHRONOLOGY OF THE HUMAN DENTITION

(Logan and Kronfeld)

| Tooth | | | First Evidence of Calcification | Crown Completed | Eruption | Root Completed |
|---|---|---|---|---|---|---|
| Deciduous dentition | | Central incisor | 5 mos. in utero | 4 mos. | 6- 8 mos. | 1½-2 yrs. |
| | | Lateral incisor | 5 mos. in utero | 5 mos. | 8-10 mos. | 1½-2 yrs. |
| | | Cuspid | 6 mos. in utero | 9 mos. | 16-20 mos. | 2½-3 yrs. |
| | | First molar | 5 mos. in utero | 6 mos. | 12-16 mos. | 2 -2½ yrs. |
| | | Second molar | 6 mos. in utero | 10-12 mos. | 20-30 mos. | 3 yrs. |
| Permanent dentition | Upper jaw | Central incisor | 3 -4 mos. | 4 -5 yrs. | 7- 8 yrs. | 10 yrs. |
| | | Lateral incisor | 1 yr. | 4 -5 yrs. | 8- 9 yrs. | 11 yrs. |
| | | Cuspid | 4 -5 mos. | 6 -7 yrs. | 11-12 yrs. | 13-15 yrs. |
| | | First bicuspid | 1½-1¾ yrs. | 5 -6 yrs. | 10-11 yrs. | 12-13 yrs. |
| | | Second bicuspid | 2 -2¼ yrs. | 6 -7 yrs. | 10-12 yrs. | 12-14 yrs. |
| | | First molar | at birth | 2½-3 yrs. | 6- 7 yrs. | 9-10 yrs. |
| | | Second molar | 2½-3 yrs. | 7 -8 yrs. | 12-13 yrs.* | 14-16 yrs. |
| | | Third molar | 7 -9 yrs. | 12 -16 yrs. | 17-21 yrs.* | 18-25 yrs. |
| | Lower jaw | Central incisor | 3 -4 mos. | 4 -5 yrs. | 6- 7 yrs. | 9 yrs. |
| | | Lateral incisor | 3 -4 mos. | 4 -5 yrs. | 7- 8 yrs. | 10 yrs. |
| | | Cuspid | 4 -5 mos. | 6 -7 yrs. | 9-10 yrs.* | 12-14 yrs. |
| | | First bicuspid | 1¾-2 yrs. | 5 -6 yrs. | 10-12 yrs. | 12-13 yrs. |
| | | Second bicuspid | 2¼-2½ yrs. | 6 -7 yrs. | 11-12 yrs. | 13-14 yrs. |
| | | First molar | at birth | 2½-3 yrs. | 6- 7 yrs. | 9-10 yrs. |
| | | Second molar | 2½-3 yrs. | 7 -8 yrs. | 11-13 yrs.* | 14-15 yrs. |
| | | Third molar | 8 -10 yrs. | 12 -16 yrs. | 17-21 yrs.* | 18-25 yrs. |

*Findings of John Oppie McCall

Potato or rice, milk-soup with crackers
½ to ⅔ cup buttered vegetables, or 1 cup vegetable soup
1 slice bread and butter
½ to ⅔ cup fruit (raw or cooked)
1 glass milk

A glass of milk should be taken in mid-afternoon and just before going to bed, or two glasses at dinner and supper.

If the above nutritional requirements are adhered to as a routine measure it is believed that dental caries will greatly be reduced in incidence.

ERUPTIVE PERIOD OF VARIOUS TEETH

One of the very common questions asked by a mother is the time of eruption of the various foundation (deciduous) and permanent teeth. The accompanying table shows the findings of Logan and Kronfeld with reference to calcification and the eruption as adapted by McCall.

CARE OF THE MOUTH

*Brushing*—Every child should have at least two junior size tooth brushes, one to use after breakfast and the other before going to bed in the evening. If convenient there should be a noon day cleaning. The mother should start to clean, systematically, the teeth of her child when it is two years of age. She should place the child on her lap, hold its mouth open with one hand and brush its teeth with the other. Comparatively few children can be given the responsibility of brushing their teeth before they are five or six years old. The mother should check and supplement the child's brushing from the age of four, five or six years, or at least until a consistent thorough result is obtained. Tooth paste is preferred to tooth powder, although cleaning may be accomplished satisfactorily with the brush alone.

*The First Visit to the Dentist* — It may be stated conservatively that at least one out of two children at three years of age have dental decay. Mouths and arches are frequently ruined for life before the age of five, or before the child actually goes to school. It is therefore imperative that the mother be advised to have the dentist check the child's teeth when they are three years old. *Bite-wing x-rays are essential to the early detection of decay between the teeth.* Additional cavities are found in at least 50% of the children x-rayed. If these cavities are found early a far greater assurance of success in the filling can be had, the pain during the actual operation will be less, and the ultimate cost to the parent will be materially reduced.

CONCLUSIONS

Prevention is far less costly than restorative dentistry and certainly much more pleasant. Absolutely nothing can be gained by neglect except increased pain, reduced vitality, and increased cost. Frequent inspection and proper care of the teeth from the time the child is three years of age to adulthood will materially lessen the number of dental cripples in middle age.

A well-balanced nutritional regimen for the expectant mother as well as for the child will do much to prevent the incidence of dental decay.

These facts are all simple, fundamental, basic to health, and such that the public health worker can disseminate and use in every day practice by virtue of his or her information, contacts, and position.

# • *RELIEF FUND HONOR ROLL* •

## ILLINOIS BEHIND 1937-38 CONTRIBUTION TO A. D. A. RELIEF FUND

According to present tabulations, Illinois is behind last year's contribution to the A. D. A. Relief Fund. The total amount contributed from Illinois dentists in 1937-38 amounted to $1,623.30, whereas but $1,438.75 had been received when copy for this article was prepared.

The JOURNAL publishes an Honor Roll for Illinois for the first time, not in the nature of a polite blackmail list but merely to give more publicity to this worthy activity and to give credit where credit is due. This list of members of the Illinois State Dental Society who have contributed to the Relief Fund of the A. D. A. through the purchase of Christmas Seals is as complete and accurate as possible considering the limited time given for checking and comes dated December 30th, 1938 from the office of Dr. Mary B. Meade, Associate Member from Illinois on the A. D. A. Relief Fund Committee. If your contribution *has been sent* to the A. D. A. offices (212 E. Superior Street, Chicago, Illinois), and your name *is not* listed below do not feel slighted as many contributions were received with no names attached or with signatures that were partially or completely illegible. An additional list of those whose contributions were received after this Honor Roll was prepared will be published in the February JOURNAL.

### G. V. BLACK DENTAL SOCIETY

Blaidson, E. N.
Bradley, R. H.
Bunch, John R.
Bunch, W. B.
Converse, Albert E.
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Dixon, J. L.
Donelan, James C.
Donelan, T. P.
Doolen, D. E.
Ellis, H. O.
Fullenwider, H. D.
Gerster, Anton
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Summers, M.
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Taylor, C. S.
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Hopkins, Richard E.
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Mahoney, J. E.
Maley, Paul A.
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Ricks, Kenneth
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Mellinger, H. A.
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Smith, C.
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Kuttler, Fred
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Forester, Fred L.
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Hundley, Royce S.
Lence, W. H.
Lumbattis, M. M.
McCall, W. G.
McCollough, G. H.
McCollum, N. J.
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McCallister, Ray A.
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Schmidt, Walter F.
Shannon, C. K.
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Webber, Karl K.
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Riedl, Donald E.
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# COMMITTEES OF A. D. A. AND FEDERAL GOVERNMENT CONFER

(*This is strictly a news article written for the readers of the* JOURNAL *by its Editor who also happens to be the chairman of the A. D. A. National Health Program Committee. It should not be considered in the light of a report emanating from the A. D. A. Committee participating in the conference.*)

THE AMERICAN DENTAL ASSOCIATION has at long last been officially recognized by those of the present Federal Adminstration charged with coordinating the nation's health and welfare activities. On December 15th, in the magnificent building of the Federal Department of Labor at Washington, D. C., a special committee of the A. D. A. met in conference with members of the technical staff of President Roosevelt's Interdepartmental Committee as the result of a request sent by President Marcus L. Ward of the A. D. A.. to the President of the United States.

Dr. Martha Eliot of the U. S. Children's Bureau presided over the conference and, in opening the meeting, stated that the Technical Committee had been conferring for several months with representatives of different organizations interested in the health of the nation for the purpose of preparing a final report to President Roosevelt. She cordially welcomed the committee from the A. D. A. and invited them to discuss freely the various phases of the program presented at the National Health Conference last July.[1]

The members of the dental committee stated that their purpose in requesting the conference was to present in detail the October report of the A. D. A. House of Delegates[2] and, therefore, in keeping with this report, they would limit their discussion to the dental aspects of the proposed national health program. They acclaimed the Technical Committee for recognizing a fact which the dental profession had long been teaching, namely, that a greater distribution of dental care is necessary to the health of our people but they were frank in pointing out that it would have been more logical to have had the A. D. A. represented in the original deliberations of the Technical Committee. They said that "had such cooperation been obtained we feel that more specific recommendations for the prevention and control of dental diseases might have been included in the Technical Committee's report. They stressed the point by requesting official representation of the A. D. A. at any future conferences that might lead to legislation effecting the health of the nation.

Each principle and recommendation of the House of Delegates report was explained and discussed in a spirit of friendliness and mutual benefit by the several

1. "National Health Conference," The Interdeepartmental Committee to Coordinate Health and Weelfare Activities, July 18-20, 1938, Washington, D. C.
2. Illinois Dental Journal 7-11-454.

members of the dental committee, the effect of which was enhanced by questions and answers from the members of both committees. Focal points of the conference were:

1. The recommendation of the A. D. A. that all health activities of the Federal Government be coordinated under one head, namely, a Secretary of Health who should be a physician and a member of the President's Cabinet, with a first assistant secretary who should be a dentist in charge of the dental phase of the nation's health program.

2. The recommendation of the dental committee that the Federal Government augment the efforts of organized dentistry to determine the cause of dental decay with a cooperative research program. It was suggested that such a program could be conducted in much the same manner as that now operating between the A. D. A. Research Commission and the U. S. Bureau of Standards.

3. The recommendation of the dental committee that increased grants-in-aid be made by the Federal Government to the 48 States for the purpose of extending present preventive dentistry programs by (1) educating children, parents, teachers, dentists, physicians, nurses, public health officials and the general public, and (2) providing dental care for those children whose parents, for financial reasons, are unable to provide such service for them.

4. The belief of the dental committee that a system of compulsory health insurance was not suited to provide adequate dental care for our population because of excessive costs. The committee presented, in support of this statement, a report on "The Cost of Dental Care Under Health Insurance" by Peter T. Swanish, Ph.D., Commissioner of Placement and Unemployment of the Illinois Department of Labor based on figures compiled by the Chicago Dental Society's Industrial Diagnostic Survey Committee. It was pointed out that according to this report the average cost for rehabilitating the mouths of adults in this country could be expected to be $53.00 per adult. Dr. Swanish, who was present in Washington on other business, appeared before the conference to interpret some of his findings and opinions.

5. The willingness of the dental profession to cooperate with any tax supported program that would provide for dental care as outlined under Principles Nos. 7 and 8 of the House of Delegates report.

6. The recommendation of the dental committee that local, state or federal dental programs be administered by dentists whose right hand advisors would be policy committees composed of dentists recommended by the local, state or national dental organizations. This arrangement, so the dental committee argued, would insure workable programs that would provide a high quality service and would prevent politics of a vicious and destructive nature from entering into the selection of the program's operating personnel. It was pointed out that precedent for such a procedure could be found in the present method of appointing State Board of Dental Examiners in most states.

7. The determination of the A. D. A. to maintain the present high standards of American Dentistry as well as the present high position of the average dentist in his community. It was explained in this connection that it would be the duty of the A. D. A. to analyze any proposed dental health legislation and broadcast to the American Public the truth as to the quantity and quality of service it might expect to receive under such legislation.

The representatives of the Government's Technical Committee present were: Martha Eliot, J. W. Mountain, Geo. St. J. Perrott, I. S. Falk and Fred K. Hoeller. The American Dental Association was represented by President Marcus L. Ward, Harold W. Oppice, Alfred Walker, C. Willard Camalier, R. M. Walls, Lon W. Morrey and Samuel R. Lewis.

# • SOCIETY BULLETINS •

## CHICAGO

Tuesday the 17th, is the date of the January meeting of the Chicago Dental Society. It will be held, as usual, at the Stevens Hotel. The essayist on this occasion will be none other than our own John Byron LaDue. In case that name doesn't ring the bell, he's more familiarly known as Jack. Jack has done so many things,—he was even a professional baseball player,—that it would be well nigh impossible to list all of his accomplishments in the short space allotted us here. He has been specializing in Prosthetics for the past 19 years and has travelled from coast to coast preaching the gospel of occlusion. His subject is, appropriately enough, "Twenty-five Years of Occlusion." Jack is Past-President of the Chicago Dental Society and Past-President of the National Society of Denture Prosthetists. He has given over 500 clinics and is in great demand both in this country and in Canada.

THE MIDWINTER MEETING, the outstanding dental classic of the year, will get under way at the Stevens beginning February 13th. It will be a four day meeting this year continuing on thru February 16th. Bob Kesel is Chairman of the Executive Committee, a job so capably filled last year by Harold Oppice. Paul Edmand has the responsibility of putting the Program together. With such men as these in charge it doesn't take a prophet to predict accurately that a treat is in store for all who attend. Dr. C. A. Dykstra, President of the University of Wisconsin, will be the speaker at the opening General Session on Monday evening. To follow in the footsteps of that outstanding educator, Glenn Frank, requires a man of real ability and Dr. Dykstra has just that qualification. Such nationally known men as Smith of Los Angeles, Tuller of New Orleans and Pyncus of London, England, will be there. For further details consult the Preliminary Program which will be in your hands shortly.

JAMES H. KEITH,
Component Editor.

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## WILL-GRUNDY

The regular monthly meeting of the Will-Grundy District Society was held at the Louis Joliet Hotel Thursday, December 8th. Following dinner, President Goldberg opened the meeting by calling on Joe Talbot to introduce the speaker of the evening, Mr. Stuart K. Hummel, Supt. of the Silver Cross Hospital of Joliet. Mr. Hummel gave a very interesting talk on his recent visit to Sweden, describing the customs, government, mode of living and the general condition of the country together with his own personal views and impressions. . . . Following this talk the regular business was taken up. Roll call and the previous minutes were quickly dispensed with following which President Goldberg appointed John Wallace and David Bradley to the Red Cross Committee. . . . A discussion on the A. D. A. relief fund was decided by all those present contributing a dollar each. . . . Dr. Brady moved that a free-will offering be taken at each meeting of the society hereafter. It carried. . . . On motions by Hoge and Fischer the new constitution presented at the last meeting was approved by all present. . . . The annual election of officers was held with the following results: President—Dr. J. C. Brady; Vice-President—Dr. Axel C. Eckman; Secretary-Treasurer—Dr. Edward A. Dainko; Librarian—Dr. Lawrence D. Furlong and Component Editor—Dr. Charles L. Lang. . . . Two new members, Drs. C. V. McKinley and Elmer J. Stephen, were received into membership. Dr. Julius C. Kamin was reinstated.

AXEL ECKMAN,
Secretary.

## ROCK ISLAND

The Rock Island District Dental Society met at the Hotel Ft. Armstrong at 6:30 P. M., Tuesday, December 20th, for the annual election of officers and a program—different, delightful, inspirational. True to form, our esteemed president, H. A. Albright, led the attack on the products of the culinary art at 6:39. His motto must be "on time all the time, excepting when ahead of time, and that's a little better time."

Our speaker for the evening, Rev. Axel G. Pearson, was introduced by the Program Chairman, H. L. Lindberg—both hail from Moline, that good old Swedish suburb of Rock Island. Dr. Lindberg has been a unit of efficiency in arranging programs for the past year, and this was no exception. . . . We now know why Rev. Pearson was named Axel, but not why the spelling isn't axle—"the spindle on which the wheel revolves." Certainly he is in the center of worthwhile thought and deed, and thinkers of his caliber are the supporting body around which many of us, like wheels, revolve and progress, carrying this body to its journey's end. . . . "How do you think, when you think?" was his topic. The food for thought he gave even surpassed the excellence of the food for bodily nourishment. We native-born Americans should feel a sense of shame if we lack any mite of loyalty for our country, and we should feel our sense of duty in the preservation of this democracy. We all are indebted to Rev. Pearson for his witty, interesting, absorbing speech.

Following in the footsteps of his predecessor, Dr. Nichols was called upon for a presentation speech that was refreshing in its wit and sentiment. As one of our oldest members in the society, he presented to another loyal, but ailing, oldest member, Bob Pearce, an expression of our esteem and affection. Bob is going to California to live with his brother, and our best wishes go with him—we packed part of them in the traveling bag we presented. Probably that $200.00 a month pension plan will lure many a good man from our midst. . . . Sidney Wiggins presented good news in the form of four more members, bringing our roster up to sixty. Sid and his committee of Morton, Kuttler, Sherrard and Nelson, have done fine work this past year. I have not seen as fine a record of accomplishment, a better spirit, a higher morale, an esprit de corps to equal that of the past year. Past President Albright is to be commended and complimented for his untiring devotion, tact, and good judgment in handling the affairs of the society. As Vice-president, I thoroughly enjoyed the association and privilege of working with him for the good of a worthy cause.

Election of officers produced the following: President, C. W. Motz; Vice-President, J. S. Servine; Secretary-Treasurer, Fred Kuttler, Jr. We ask the membership for their continued loyalty and support, and promise in return a program of worthwhile, thought-provoking, practice building clinics, and enough entertainment to enliven it.

My "Swan Song" is sung.

CHARLES W. MOTZ,
Component Editor.

* * *

## WINNEBAGO

The main business for the December meeting of the W. C. D. S. was the election of officers for 1939. Clyde Cole was elected president; Bill Magnelia, vice-president; and Martin Johnson, secretary. The following men were selected by Dr. Cole for his various committees: Program—C. Harry Grandstaff, Charles Helm and Carleton Reed; Board of Censors—Allen Olson, V. L. Heath and E. J. Witherstine; Sick Committee—E. J. Clothier, Fred Mead and H. R. Rust; Publicity—Bill Magnelia; Editor—Leo J. Smith.

Congratulations to Carl Olson, the retiring president. You did a swell job, Carl, not only as "Prexy" but also as chairman of the post-meeting round table session.

Our "visiting speaker," instead of being a visitor, turned out to be our own Charles Helm. Dr. Helm's paper on "Stabilization of Lower Dentures" was very interesting. After the reading he gave a clinic. The technic shown, though simple, was very efficient if followed step by step. The audience, consequently, was

exceptionally attentive as they didn't want to miss a thing.

Suprise! And I mean surprise! The Christmas party brought them out in a big way. The attendance was the largest in years. It would be nice if the boys would extend their Christmas spirit throughout the year and attend meetings regularly. But that was a dandy party, wasn't it? Buck Rust and Allen Olson did a nice job of Santa Clausing, and the various Dental Laboratories kicked in with some good prizes for the Christmas tree. Mr. Hunt, manager of the Nelson Hotel, also donated two very nice presents. Incidentally, Dr. Charles Sowle, who has been hospitalized for over a year, was sent a Christmas remembrance from the local boys.

DOTS ABOUT DOCS: Ed Witherstine is taking bowling lessons from Orval Crossan. Though Orval is a tough customer, Ed shows lots of promise. . . . Welcome to Bill Boyd, from good old Seventh Street, who recently joined the bowling matches. . . . I'll bet the next time Cyril Sharp goes on a trip, he takes a brick with him. . . . Gene Spafford ran a "belly ache" into a nice winner at the party. . . . Art Hoffman must be in Florida. . . . George Lamphere Santa Claused at the Elks' Christmas party. He did it well, too. . . . I'm Santa Claus in those Elk card games all year round.

LEO J. SMITH,
Component Editor.

* * *

## G. V. BLACK

Through the good offices of the Illinois State Health Department, the efficient and capable head of its Dental Division, Dr. C. F. Deatherage, and the Illinois State Dental Society, this component had the pleasure of hearing Dr. John C. Brauer of the University of Iowa, at its December meeting. Dr. Brauer is that rare type of speaker who holds his audience completely fascinated and on this occasion, speaking on "Children's Dentisty," his listeners asked for more at the end of his two hour rapid fire talk. As one listener aptly suggested, any dentist who ever did dental work for children or ever expects to will serve himself and his patients better after hearing this fine lecture. Drs. Deatherage, L. W. Neber, Chairman of the State Study Club Committee, and J. R. Jones, Local Program Chairman, have the thanks of all who attended this outstanding meeting.

Some two or three months ago President McDermott appointed a Committee composed of Drs. Robert T. Curren, Chairman; R. E. Blunk; O. H. Seifert; L. Z. Dennison; J. J. Donelan, Jr., and B. B. Beatty, and charged it with the man's size task of working out an equitable fee schedule and program for the dental care of indigent patients. Involving as it did, the sanction of Illinois Relief Officials, many meetings and much work was necessary. In the end, however, Chairman Bob and his Committee came through with a complete and comprehensive program which, it is believed, may serve as a model plan for action along this line thruout this state. We salute Bob and his earnest coworkers. If in the future, information on this plan should be desired by other components it will be available to their authorized representatives.

Before hying away to New Orleans and other warm and pleasant spots of the salubrious Southland, Chairman Jones arranged for excellent meetings on January 12th and February 9th. On January 12th Dr. R. W. Swanson of the Department of Oral Pathology at Northwestern University Dental School will speak on the subject, "Pocket Elimination in Peridontoclasia." On February 9th several members of this society will give table clinics. We can assure you that our local talent will provide plenty of food for thought. This component meets at the St. Nicholas Hotel in Springfield on the second Thursday of the month and visiting dentists are always welcome.

JOHN W. GREEN,
Component Editor.

* * *

## NORTHWEST

At our November meeting held at Hotel Freeport, a large attendance turned out to hear Dr. Henry Glupker give a lecture on "Immediate Dentures." It was a great presentation of an important subject and everyone obtained much valuable information.

Last month I stated that Dr. Tyler was the proud owner of a Buick, well it seems to be catching as our President, E. L. Griffith, has one now. . . . My, my, my, what a depression or maybe a recession. . . . Now that the holidays with their fun and enjoyment are over we can resume our practices until another year rolls around. . . . We understand that Foy Matter is planning a vacation in Florida. Do we envy him! Bring back a little warm weather, will you Foy? . . . Our next meeting will be January 9th at which time Dr. M. N. Federspiel will present the subject, "Surgical Operations of Interest to Dental Practitioners." This should be a good meeting, and we take this opportunity of inviting members of other societies to attend.

R. D. STROHACKER,
Component Editor.

* * *

## QUINCY STUDY CLUB

(*Editor's Note: Because of an oversight in this office the report of the November meeting of this study club did not appear in the Decemebr* JOURNAL, *therefore both the November and December meetings are included in this report.*)

NOVEMBER MEETING: The Quincy Dental Study Club met Tuesday afternoon and evening, November 8th, with Dr. Carroll Stuart of Chicago as our instructor—and did we have a meeting. Dr. Stuart lectured in the afternoon on "Oral Surgery as Found in Daily Practice." Slides were used to illustrate points in technic. At the evening session a round table discussion was held during which many questions and answers passed back and forth between teacher and pupils. All pronounced both sessions a huge success and Dr. Stuart won himself a ready welcome at all times in Quincy. . . . Members of the T. L. Gilmer Dental Society were guests of the club at this meeting. . . . A total of 51 dentists were in attendance.

DECEMBER MEETING: The December meeting of this club was held Tuesday, December 13th. The annual afternoon and evening sessions with dinner intervening was the order of the day. Dr. Arthur Engel of St. Louis was our instructor and the subject, "Surgical Removal of Teeth." Dr. Engel presented an illustrated lecture showing step by step his technic for removing the various types of teeth. The instruction was very valuable and exceptionally well given. The boys of the club were high in their praise of Dr. Engle and would welcome a return engagement. . . . During a short business session Dr. A. H. Sohm was appointed chairman of a committee to investigate radio programs as outlined by the State Society. . . . The next meeting of the club will be held on January 10th with Dr. Ben Friedman of Chicago serving as instructor.

JESSE F. KEENEY,
Secretary.

* * *

## HISTORIC MATERIAL WANTED FOR DIAMOND JUBILEE

Any member of the Illinois State Dental Society having material that is representative of the historical or scientific development of our Society and who would care to exhibit it at the Diamond Jubilee Meeting in Peoria, May 8, 9, 10, 11, 1939, please contact Dr. J. M. Elson, Chairman of Scientific Exhibits, 627 Jefferson Bldg., Peoria, Illinois.

* * *

## NORTHWESTERN UNIVERSITY DENTAL SCHOOL ALUMNI ASSOCIATION

The annual luncheon of the Alumni Association of Northwestern University Dental School will be held during the Midwinter Meeting of the Chicago Dental Society. The Grand Ballroom of the Stevens Hotel has been reserved for 12 noon on Wednesday, February 15th.

GEORGE W. TEUSCHER,
President.

* * *

## XI PSI PHI FRATERNITY GOLDEN ANNIVERSARY

The Golden Anniversary Celebration of the founding of Xi Psi Phi will be held at Ann Arbor, Michigan, on February 8th and 9th, 1939. An elaborate program has been arranged which includes the unveiling of a memorial on the campus of the University of Michigan, in commemoration of

the founding. The founders will be guests of honor. All Xi Psi Phis are urged to attend this notable and outstanding event.

J. Floyd Alcorn, General Sec'ty, Golden Anniversary Committee, 3720 Washington Blvd., St. Louis, Missouri.

* * *

### EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS, REGULAR ARMY

An examination for the selection of candidates for appointment in the Dental Corps, Regular Army, will be held during the period of February 13-18, 1939.

The examination, which will include both physical and professional examinations, the latter consisting of written, oral and clinical tests, is open to male citizens of the United States between the ages of 22 9/12 and 31 9/12 years at the time of the examination, who are graduates of acceptable dental schools and who have had at least 1 11/12 years subsequent practice in their profession.

Full information and application blanks will be furnished upon request to The Adjutant General, War Department, Washington, D. C. Applications will not be considered after January 31, 1939.

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## IMMEDIATE COMPLETE DENTURE RESTORATION

(*Concluded from page* 23)

should be removed and placed in water every night. This rest from the denture will give the oral tissues the best possible chance to remain in a healthful state.

3. *That he should expect the denture to feel strange* and new in the mouth. It would naturally follow that eating must be performed slowly and carefully at first and that the mode of speech would be somewhat affected for a day or two.
4. *That he should expect no unusual amount of pain* but that a surgical operation has been performed and as a result his mouth will be sore. The patient is instructed to return for the first adjustment.
5. *As to the approximate length of time* he may expect the denture to serve him well. Possible subsequent denture work is also explained to the patient.

### Immediate Denture Service Is a Conservative Treatment

The application of the immediate denture principle is conservative from the beginning to the end. In the first place, every tooth not directly concerned with the esthetic requirement is removed and the mouth allowed to heal perfectly before the denture is started. This means not only a more accurate fit at the time the denture is made but also less change from resorptive processes over a given period of time. We advocate no alveolectomy service when the anterior teeth are removed but rather just as simple an operation as conditions will permit. For these reasons, it is never necessary to resort to lining the immediate denture with some impression material in order that it may be retained in the patient's mouth.

As a final vote for conservatism, we agree with Dr. Herbert A. Potts, writing in the Journal of the American Dental Association, March 1927, when he said, "The alveolar process is an organ, designed as a supporting structure and should be retained, if possible, in its entirety, after the extraction of teeth."

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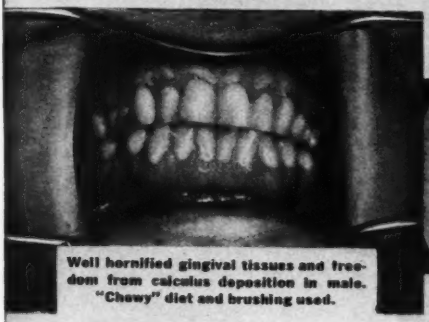
**EFFECTS OF ADEQUATE GUM STIMULATION**

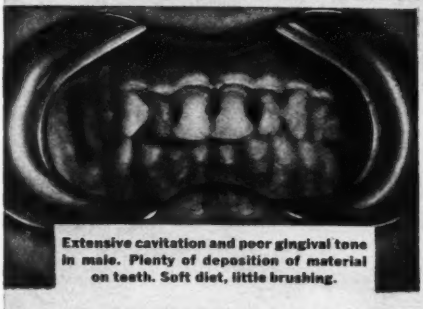


Well hornified gingival tissues and freedom from calculus deposition in male. "Chewy" diet and brushing used.

Normal capillary structure. Capillary loops normal in length and diameter. They tend to be evenly distributed.

Capillary structure far from normal. Blood stasis. Definite dilation of capillary loops and limbs. Distribution poor.

**UNSATISFACTORY GUM STIMULATION**



Extensive cavitation and poor gingival tone in male. Plenty of deposition of material on teeth. Soft diet, little brushing.

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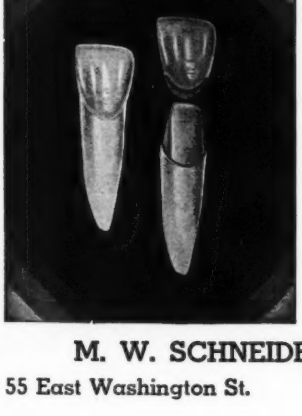

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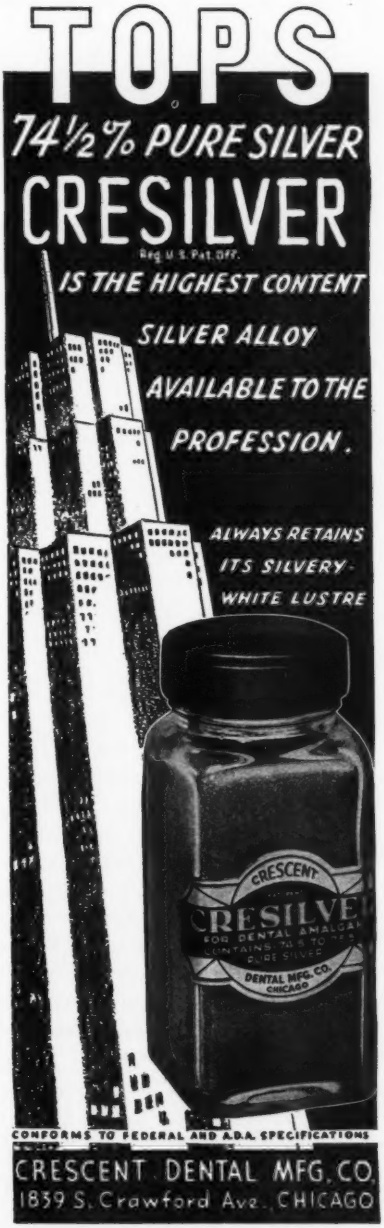

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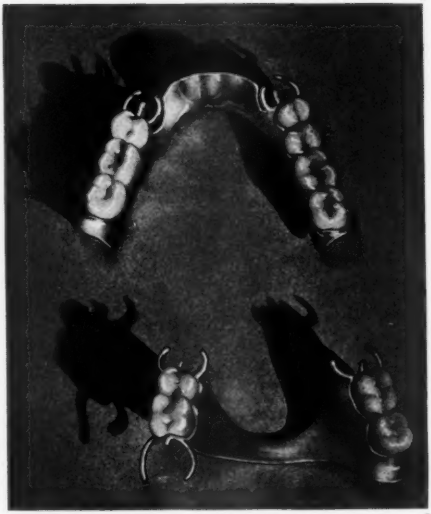

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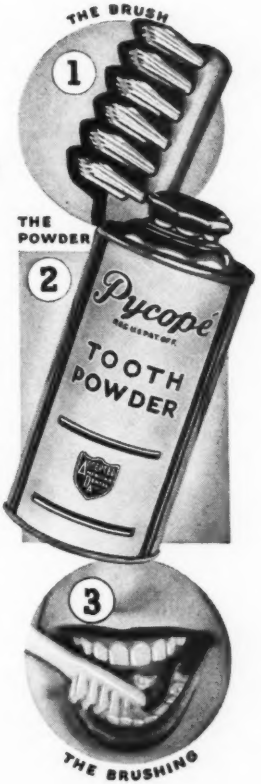


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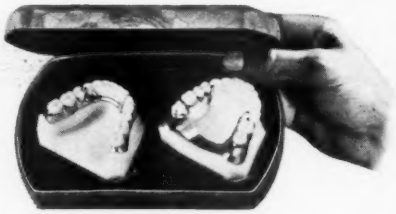

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